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CHEATING THE GOVERNMENT: DOES TAXPAYER PERCEPTION MATTER?

*Daniel Jeong-Dae Lee**

Do people cheat because they can get away with it or because they feel that the rules are unfair? This paper addresses this question in the context of tax evasion. Specifically, taxpayer perception is incorporated into a widely used consumption-based method for estimating income tax evasion. Compared to the standard method, which distinguishes taxpayers only by their occupational or income type as a way of measuring their "ability" to misreport income, the refined method introduces taxpayers who may be "able but unwilling" to cheat because they feel fairly treated with respect to public services and as compared to other taxpayers. Applied to a longitudinal data for the Republic of Korea (2007–2015), the standard method yields a uniform tax evasion rate of 13 per cent, but the refined method provides a range of 7 to 25 per cent based on taxpayer perception. This implies that strategies for improving tax compliance must be tailored to different motivations for tax evasion.

JEL classification: H26

Keywords: tax evasion, tax compliance, tax morale, taxpayer perception, third-party reporting, Engel curve

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I. INTRODUCTION

Tax evasion is as old as taxes themselves. It is a way of cheating the government (Cowell, 1990), with adverse effects on social welfare.[1] Assessing the extent and determinants of tax evasion remains a challenge given its hidden nature.

In the economic literature, the benchmark model posits that people cheat if the probability of being caught and punished is low compared to potential monetary savings (Becker, 1968; Allingham and Sandmo, 1972). A popular comparison is between wage earners who are "unable" to cheat because their incomes are subject to withholding or third-party reporting, versus the self-employed who are "able" to cheat because their incomes are harder to detect by tax authorities (Slemrod, 2007; Kleven and others, 2011).

Tax authorities are certainly concerned about enforcement, but they also emphasize "tax morale," which is generally assumed to mean increasing voluntary compliance with tax laws and creating a social norm of compliance (Luttmer and Singhal, 2014). Behavioural models in economics also suggest that tax decisions are influenced by perceptions of fairness and other factors that fall outside the standard, expected utility framework (Bordignon, 1993; Feld and Frey, 2002; Torgler, 2003, among other studies). Not accounting for such factors could result in overattributing evasion to the lack of heavy enforcement.

To contribute to this debate on whether taxpayers are "unable" or "unwilling" to cheat, the following hypothesis is examined: *Ability to cheat matters only if one is willing to cheat*. If this were true, taxpayers with identical occupational or income characteristics might exhibit very different compliance behaviours.

To empirically test this hypothesis in the absence of reliable data on tax evasion, the consumption-based method for estimating income tax evasion is extended. This method was pioneered by Pissarides and Weber (1989) and has been widely applied by (Lyssiotou, Pashardes and Stengos, 2004; Johansson, 2005; Hurst, Li and Pugsley, 2014; Kim, Gibson and Chung, 2017; Kukk and Staehr, 2017; Engström and Hagen, 2017, among other studies). It is based on measuring "excess" consumption among the self-employed as evidence of undeclared income, compared to the consumption of wage earners, which serves as the benchmark.

[1] If widespread, tax evasion could constrain the provision of necessary public services. In addition, if higher tax rates were applied to a narrow tax base to make up for the revenue shortfall because of evasion, there could be adverse welfare effects. Moreover, if concentrated among certain segments of society, tax evasion could undermine trust and social cohesion.

The contribution from the present paper is to introduce another layer of heterogeneity among taxpayers based on their perception of fairness with respect to public services and compared to other taxpayers. Applying the refined method to longitudinal household survey data for the Republic of Korea, a higher rate of tax evasion is estimated for the self-employed who feel unfairly treated, while a lower rate is found for those who feel fairly treated, compared to what is predicted using the standard method. The Republic of Korea is used as an illustration given its high degree of self-employment relative to income level, but the refined method is replicable in other countries.

This paper is organized as follows. In section II, the conceptual framework is laid out. Section III contains an explanation of the consumption-based method for estimating income tax evasion. Section IV includes a discussion of the data used. Section V provides an overview of the estimation results and some robustness checks. Section VI concludes.

II. CONCEPTUAL FRAMEWORK

In this section, the conditions for tax evasion are examined, as shown in the benchmark model in the literature and a simple extension, which has been proposed to incorporate taxpayer perception. This is followed by the presentation of a problem tree approach to determine which taxpayers are both “able” and “willing” to cheat.

Conditions for tax evasion

The standard framework for considering a taxpayer’s choice of whether and how much to misreport income is a deterrence model first formulated by Allingham and Sandmo (1972), who adapted the model of the economics of crime of Becker (1968). Under this model, people cheat if the probability of being caught and punished is low compared to potential tax savings. The expected utility function is given as:

$$E(U) = (1-p)U(W-\theta X) + pU(W-\theta X-\pi(W-X)) \quad (1)$$

where W and X are the actual income and the reported income, respectively. Tax is levied at a constant rate θ on X. Importantly, the two states are separated by p, the probability of detection; and π is the penalty rate. Letting Y and Z stand for the net income without and with detection, respectively, the first-order condition for an interior solution gives $\frac{U'(Z)}{U'(Y)} = \frac{(1-p)\theta}{p(\pi-\theta)}$, which implies that a higher probability of detection discourages tax evasion. Taking the derivative of the expected utility when $W = X$, the condition for evasion is $p\pi < \theta$, namely, the ability to escape detection matters.

To this model, a parameter, which is applied regardless of detection, is added to account for factors other than the threat of punishment, which may influence taxpayer behaviour. Specifically, taxpayers may be less inclined to cheat if they view the tax system as fair and are satisfied with the public services they receive. In contrast, if they feel that they are unfairly treated, they may perceive some tax evasion is justified (Bordignon, 1993; Barth, Cappelen and Ognedal, 2013). The expected utility function becomes:

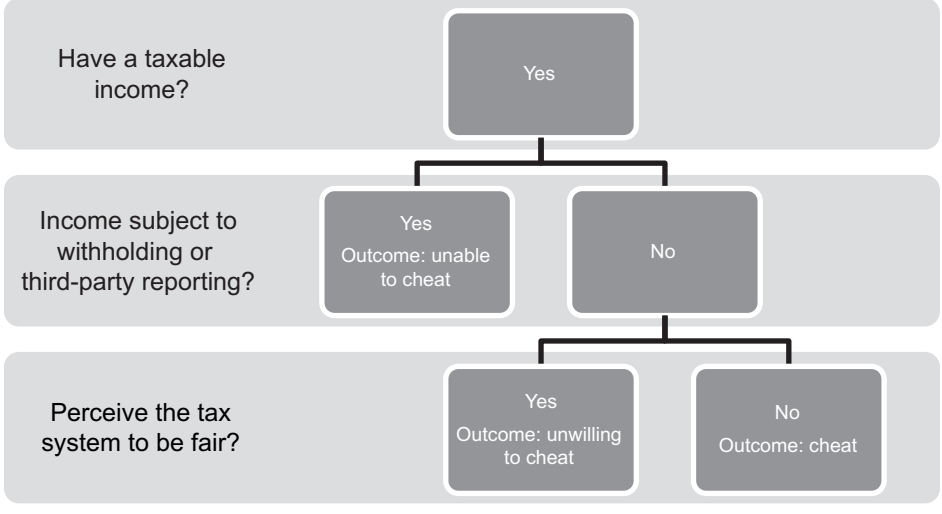
$$E(U) = (1-p)U(Y) + pU(Z) - C(E-E^*) \quad (2)$$

where the additional parameter is a function of evaded income, $E = W - X$, and what the taxpayer perceives to be "justified" evasion, $E^* \geq 0$. In equation 2, the condition for tax evasion not only depends on the probability of detection, but also on taxpayer perception, such that optimal evasion is lower than what is predicted under equation 1 if $E > E^*$, but higher if $E < E^*$.

Problem tree approach

As decisions related to tax evasion become more complex, a problem tree approach is suitable to determine tax evasion outcomes based on key parameters contained in equation 2. The steps are shown in figure 1.

Figure 1. Grouping taxpayers by income and perception



Based on the restricted sample of households with a taxable income, taxpayers are differentiated by whether their income is subject to withholding or third-party reporting (W_T) or simply self-reported (W_S). The probability of detection would be close to 1 if the taxpayer were to declare an amount below W_T as such discrepancies are easy to detect, whereas reporting below W_S may go undetected.[2] As taxpayers typically draw on various types of income, a certain threshold on the ratio $\frac{W_S}{W_S + W_T}$ is applied to separate those who are "able" versus "unable" to cheat.

In practice, employees who rely mostly on labour income fall under the former, while the self-employed who depend on business income are under the latter. Whether capital income from interest, dividends and rent qualifies as W_T or W_S depends on the extent to which the country's financial sector is subject to third-party reporting, including at the international level, without which offshore accounts could facilitate tax evasion.

After the sample is restricted to taxpayers that are "able" to cheat, they are differentiated based on their perception of fairness, which is related to the "justified" tax evasion parameter E^* in equation 2. Accurately measuring taxpayer perception is challenging. For instance, for the World Values Surveys, respondents are asked whether tax evasion is "never, sometimes, or always justified", but it is difficult to confirm whether they would act in such a manner.[3] In other cases, respondents are asked whether they would fully declare their income if misreporting were to go undetected, but it is questionable why anyone would reveal such information if there is even a small chance that it might be used against them.

An alternative approach is to construct a latent variable based on taxpayer responses to questions, such as the following: How does one's tax burden compare to others' earning similar income levels?; Are the wealthy paying enough taxes?; and Is the quality of public services commensurate with your tax payment? Given that "fairness" is likely to reflect multiple dimensions, such as horizontal and vertical equity and reciprocity, structural equation modelling is used to pull these dimensions into a latent variable and then apply a certain threshold to distinguish between those "unwilling" and those "willing" to cheat.[4] Such grouping of taxpayers by perception along with income

[2] Currently, many countries make extensive use of withholding and third-party reporting, under which the audit rate alone is a poor proxy for the probability of detection. For instance, firms remit the majority of tax revenue to the government, including through withholding taxes owed by employees. The financial sector, including banks, insurers and pension funds, also reports taxable income earned by individuals to the government. Such information could be compared to what is declared by the taxpayer. See also Kleven and others (2011).

[3] World Values Surveys have been used in empirical studies on tax morale, such as Torgler (2003).

[4] Structural equation modelling has emerged as a useful tool in other social sciences, including education and psychology. In the economic literature, Schneider and Enste (2000) applied structural equation modelling to estimate the extent of the shadow economy based on country-level variables.

serves as a basis for incorporating taxpayer perception into the estimation of tax evasion, as discussed in the following section.

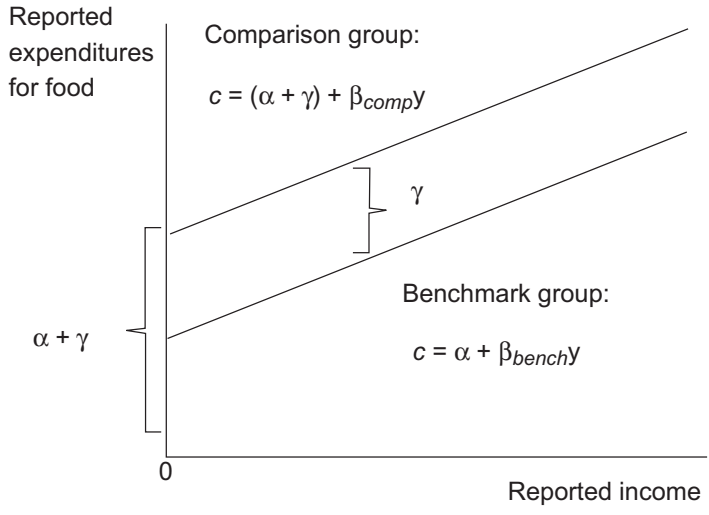
III. CONSUMPTION-BASED METHOD

This section provides an explanation of the consumption-based method for estimating income tax evasion, which has been widely applied in the literature (Pissarides and Weber, 1989; Lyssiotou, Pashardes and Stengos, 2004; Johansson, 2005; Hurst, Li and Pugsley, 2014; Kim, Gibson and Chung, 2017; Kukk and Staehr, 2017; Engström and Hagen, 2017, among other studies). Compared to other methods, such as the currency demand approach, this one is based on household income and expenditure surveys, which are widely available in most countries and can be used to incorporate micro-level information, such as taxpayer perception. It is also more replicable compared to special audit programmes or experiments with actual taxpayers that have been deployed in few countries (see, for instance, United States, Internal Revenue Service, 2016; and Kleven and others, 2011), but could be costly and raise issues of legality in other countries.

Basic approach and assumptions

In figure 2, the consumption-based method is illustrated. The figure shows two log-linear Engel curves, one for wage earners (benchmark group) and the other for the self-employed (comparison group). Letting c stand for log food expenditures and y log

Figure 2. Engel curve showing consumption-income relationship



disposable income, β denotes the elasticity of consumption with respect to income. The intercept difference γ between the two curves measures the "excess consumption" of the self-employed, which is used to estimate the undeclared fraction of income: 1 – exp $(-\gamma/\beta)$.

This method relies on three central assumptions. First, the elasticity of consumption with respect to income, β, is equal for the two groups, as illustrated by the curves having the same slope. Second, neither group systemically misreports spending on certain items, such as food or non-durables. Food is widely used in the literature, as it is mundane enough for individuals not to be afraid of reporting truthfully and purchased regularly, and accordingly, less subject to unintended misreporting. An exception to this is Lyssiotou, Pashardes and Stengos (2004), who use non-durable expenditures to account for demand heterogeneity. Third, wage earners report their true incomes, while the self-employed systematically underreport their income by a constant factor.[5] One additional assumption is that people misreport their income in surveys to the same degree that they misreport it to the tax authorities (Hurst, Li and Pugsley, 2014).

Accounting for transitory income

Given that household consumption is not influenced by current income, but instead by a more permanent measure of income, estimating the Engel curve using the current income would result in a measurement error. Specifically, transitory income fluctuations would attenuate the estimate of the income elasticity (Wooldridge, 2009), which, in turn, would result in an overestimation of income misreporting among the self-employed. For household i, let c_i stand for food expenditure, y_i^p the permanent income, and X_i a vector of variables affecting consumption. D_{it} is a dummy taking the value 1 for the self-employed. A log-linear Engel curve is given as:

$$lnc_i = \gamma D_{it} + \beta lny_i^P + \theta X_i + \varepsilon_i \quad (3)$$

Let g_i stand for a random variable showing the degree of transitory income variation such that $y_i = g_i y_i^p$. The mean of g_i is assumed to be the same for both groups, but the variance may differ. Substitution gives an Engel curve in terms of the current income, with the transitory element pushed to the error term:

$$lnc_i = \gamma D_{it} + \beta lny_i + \theta X_i + (\varepsilon_i - \beta lng) \quad (4)$$

[5] If wage earners also underreport their income, the method will only provide a lower bound estimate of tax evasion.

Pissarides and Weber (1989) and other early studies dealt with this through instrumental variable (IV) techniques, but more recent studies (Hurst, Li and Pugsley, 2014; Kim, Gibson and Chung, 2017; Engström and Hagen, 2017) have exploited panel data and constructed multi-year average income measures. In this paper, the latter approach is followed. With average income, positive and negative variations of transitory income cancel each other over time, especially for the self-employed, who typically have higher income variation from year to year. This also implies that the covariance between the degree of underreporting and the degree of transitory income variation disappears over time. The Engel curve is now written as:

$$lnc_{it} = \alpha + \gamma D_{it} + \beta \overline{lny_{it}} + \theta X_{it} + \mu_t + \varepsilon_{it} \quad (5)$$

where subscript *t* denotes year, $\overline{lny_{it}}$ is the mean value of reported incomes over time for the same household *i*, μ_t is the time effect, and ε_{it} the cumulative effects of unobserved determinants over time.

Incorporating taxpayer perception

In previous studies related to this subject, income tax evasion was estimated based on a single comparison group, that is, the self-employed. However, as discussed in section II, such an approach could overlook factors other than tax savings from misreporting, which may influence taxpayer behaviour. To test the hypothesis that *ability matters only if one is willing to cheat*, one could take the interaction term approach. Let $D_{A\,it}$ and $D_{W\,it}$ denote dummy variables taking the value 1 for the "able" and the "willing" to cheat, respectively, and $D_{W\,it} * D_{A\,it}$ be the interaction term. The log-linear Engel curve for estimation becomes:

$$lnc_{it} = \alpha + \gamma D_{A\,it} + \delta D_{W\,it} + \omega D_{W\,it} * D_{A\,it} + \beta \overline{lny_{it}} + \theta X_{it} + \mu_t + \varepsilon_{it} \quad (6)$$

where the parameter of interest is ω. With the interaction term, the partial effect of ability to cheat on consumption would be $\gamma + \omega D_{W\,it}$.

One question, however, is whether the benchmark group should be the "unable and unwilling" to cheat as in equation 6 or simply the "unable" to cheat. In the former case, the "unable" to also cheat should be allowed in a way that is inconsistent with the main assumptions discussed earlier. Accordingly, in the present case, two comparison groups are explicitly introduced, "able but unwilling" and "able and willing" to cheat, as shown by $D_{AUW\,it}$ and $D_{AW\,it}$, respectively:

$$lnc_{it} = \alpha + \gamma D_{AW\,it} + \delta D_{AUW\,it} + \beta \overline{lny_{it}} + \theta X_{it} + \mu_t + \varepsilon_{it} \quad (7)$$

If the concerned hypothesis were true, δ would be insignificant, namely the "able but unwilling" to cheat would exhibit a similar behaviour to the benchmark group, those that are unable to cheat.

IV. DATA AND SAMPLE RESTRICTION

Compared to other members of the Organization for Economic Coordination and Development (OECD), the Republic of Korea has a relatively high degree of self-employment, which, accordingly, presents a relevant case for testing this method. The panel data of the Republic of Korea, drawn from the National Survey on Tax and Benefit, contains information on approximately 5,000 households across nine years (2007–2015), including the occupations, incomes, assets, expenditures, taxes and social security, as well as gender, age and educational attainment of family members. Importantly, the most recent round of the survey for 2015 contains questions on how the respondents perceive the tax system and the factors that affect their taxpaying decision.

Following the steps outlined in figure 2, households with income levels below the exemption threshold and households with zero annual expenditure are eliminated. To maintain some degree of homogeneity, only households whose primary income earner is between the ages of 20 and 70 are retained.

The next step is to differentiate taxpayers by their occupational or income type. Following previous studies, the "able" to cheat is defined as households that derive at least 25 per cent of their total income from business income, and the "unable" to cheat are households that attain less than 1 per cent of their total income from business income.

Then, a latent variable "willing to cheat" is constructed based on responses to the questions regarding vertical and horizontal equity and satisfaction with public services, discussed in section II. The responses are scaled from 1 to 5; the scale is reversed when necessary for consistency. These variables are standardized and combined into a latent variable using structural equation modelling. As shown in figure 3, the latent variable "willing" to cheat is most closely associated with horizontal equity and public services. The top and bottom quartiles, according to this measure, are defined as the "unwilling" and "willing" to cheat, respectively, and the two middle quartiles are dropped from the sample.

In accordance with previous studies, the following control variables are considered:

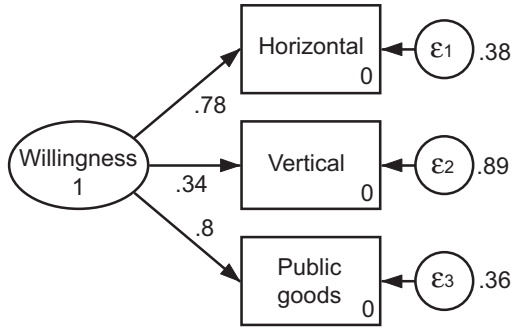
(a) *Family size*: more mouths to feed or clothe, thus likely to have a positive sign.

(b) *Capital city dummy*: price levels are higher, thus likely to have a positive sign.

(c) *Home ownership*: without the need for rental fees, general spending may be higher, thus likely to have a positive sign.

(d) *Age of primary income earner*: likely to spend more with age, but at a diminishing rate; thus, it is likely to have a positive sign, but the quadratic would have a negative sign.

Figure 3. Constructing a latent variable based on taxpayer perception



Note: The circle denotes the unobserved latent variable, and the squares denote the observed variables, which are based on responses to questions regarding horizontal and vertical equity and satisfaction with public goods and services. The latent variable is constructed based on a maximum likelihood estimation.

(e) *Education of primary income earner*: higher educational attainment, through higher income, may result in more spending, thus a positive sign.

(f) *Hours worked*: working more hours may increase income and spending, but long working hours may also indicate low wages; thus, the expected sign is unclear.

Table 1 presents the descriptive statistics for the benchmark group "unable" to cheat (17,125 observations), and the two comparison groups "able, but unwilling" (4,474 observations) and "able and willing" to cheat (2,142 observations). Approximately 25 per cent of the sample is self-employed (defined as respondents whose business income share is 25 per cent or above),[6] and the rest of the sample consists of wage earners (respondents whose business income share is 1 per cent or below). Those with business income share above 1 per cent but below 25 per cent are dropped. Based on summary statistics, there are no marked differences across the three groups, but the "able and willing" to cheat tend to be located in the capital city and work longer hours, perhaps to meet the higher cost of living.

[6] The 25 per cent threshold is applied in Pissarides and Weber (1989) and subsequent studies. A robustness test with respect to this assumption by also applying slightly lower or higher thresholds does not change the main findings of the present paper.

Table 1. Descriptive statistics

	Unable (wage earner)	Able but unwilling (self-employed)	Able and willing (self-employed)
Log of income	8.5582	8.4850	8.5793
	(0.4357)	(0.4160)	(0.4733)
Log of food expenditures	6.7493	6.6891	6.8673
	(0.4911)	(0.5162)	(0.5584)
Family size	3.8102	3.8355	3.7005
	(1.0054)	(1.1314)	(0.9031)
Capital city	0.2071	0.2047	0.3086
	(0.4053)	(0.4035)	(0.4620)
Age	47.0318	47.7295	47.1328
	(9.1368)	(9.0039)	(8.9109)
Education	2.4918	2.3596	2.5125
	(0.6469)	(0.6932)	(0.6220)
Hours worked	42.1849	46.3978	49.1839
	(8.9804)	(15.5131)	(13.0722)
Observations	17 125	4 475	2 142

Note: Income is the three-year average income. Capital city dummy denotes 1 if the household is based in Seoul and 0 otherwise. Age and education refer to those of the household head, or the primary income earner. Educational attainment is on a scale of 1 to 3, where 1 is lower-secondary or below, 2 is upper-secondary and 3 is tertiary. Working hour is the average per week.

V. ESTIMATION RESULTS

This section contains a report of the main estimation results and provides some robustness checks. Full results are shown in annex I.

Main results – taxpayer perception in the food Engel curve

Log food consumption is regressed on log disposable income and a set of control variables, as in equations 5 and 7. Table 2 shows the estimates of key parameters, $\hat{\beta}$, $\hat{\gamma}$ and $\hat{\delta}$, and the corresponding estimated amount of income underreporting, denoted as $1 - \hat{k}$. There are 23,946 observations. The estimated elasticity of consumption with respect to income, $\hat{\beta}$, is stable across different specifications, with a 1 per cent increase in income resulting in an increase of just under 0.4 per cent in food expenditure based on the ordinary least squares (OLS) estimator.

Compared to the "unable" to cheat, the "able" to cheat consume about 6 per cent more, as shown in column 2. The estimated tax evasion rate is 13 per cent assuming that people cheat if they can. However, given that some taxpayers may be "able but unwilling" to cheat, taxpayer perception is incorporated in column 3 based on the latent variable approach. While $\hat{\gamma}$ is positive and statistically significant, it is relatively small compared to $\hat{\delta}$ for the "able and willing" to cheat who consumes 11 per cent more than the benchmark group. This translates into a tax evasion rate of 25 per cent, or double that of the "average" evasion rate for the "able" to cheat.

Columns 4 and 5 show the instrumental variable (IV) results. In accordance with Hurst, Li and Pugsley (2014), education is used as instrument for income, as it would affect food consumption only through the income effect.[7] While it passes the endogeneity tests,[8] $\hat{\beta}$ is implausibly large. This is similar to the findings of Engström and Hagen (2017), who compare the performance of several instruments, including education, housing and capital income, and conclude that the use of the IV approach is inferior to a simple OLS based on multi-year average income. Given the large $\hat{\beta}$, the estimated tax evasion rates are lower than when using OLS. Nevertheless, columns 4 and 5 exhibit the same trend as columns 2 and 3.

Full estimation results in annex I show that the control variables have the expected sign. While family size, capital city dummy, age and education are statistically significant, home ownership dummy and hours worked are not. The year dummies are included with 2008 as the base year; the first and last years in the sample, 2007 and 2015, do not appear because of the use of three-year average income.

To determine whether taxpayer perception emerges as a significant factor under other specifications, two robustness checks are conducted.

Taxpayer perception under demand heterogeneity

Following Lyssiotou, Pashardes and Stengos (2004), to account for demand heterogeneity among households, estimation results with log of non-durable expenditures as a dependent variable are shown in table 3. $\hat{\beta}$ is stable across different specifications, with a 1 per cent increase in income resulting in an increase of approximately 0.3 per cent in non-durable expenditures based on the OLS estimator.

[7] While used in the literature, education is not liked to be a perfect instrument. For instance, education may affect how people are conscious about their nutrition and accordingly their food consumption pattern.

[8] The null hypothesis of the Durbin and Wu-Hausman tests is that the variable under consideration can be treated as exogenous. If the test statistics are highly significant, the null can be rejected and treated as endogenous.

Table 2. Estimation results: log of food expenditures as dependent variable

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV
able		0.0554***		0.0922***	
		(0.00582)		(0.00698)	
able but unwilling $\hat{\gamma}$			0.0261***		0.0819***
			(0.00680)		(0.00865)
able and willing $\hat{\delta}$			0.113***		0.111***
			(0.00851)		(0.00928)
log(income) $\hat{\beta}$	0.387***	0.393***	0.387***	0.866***	0.858***
	(0.007)	(0.00734)	(0.00737)	(0.0295)	(0.0305)
Observations	23 946	23 946	23 946	23 946	23 946
R-squared	0.282	0.284	0.287	0.144	0.149

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. OLS, ordinary least squares; IV, instrumental variable.

	$\hat{k}$	$1 - \hat{k}$
OLS		
able	0.869	0.131
able but unwilling	0.935	0.065
able and willing	0.747	0.253
IV		
able	0.899	0.101
able but unwilling	0.909	0.091
able and willing	0.879	0.121

Note: $\hat{k}$ is the general term for the fraction of the true income, which is declared.

Compared to the “unable” to cheat, the “able” to cheat consume approximately 7 per cent more, as shown in column 2. This gives an “average” tax evasion rate of 19 per cent.

With taxpayer perception in column 3, essentially the same trend is established as in the case of the food Engel curve. Compared to the “unable” to cheat, the “able but unwilling” consume approximately 4 per cent more. On the other end of the spectrum, the “able and willing” consume approximately 13 per cent more compared to the same benchmark group. This gives an estimated tax evasion rate of 33 per cent, three times than that of the “able but unwilling.”

Columns 4 and 5 show the IV results. Again, $\hat{\beta}$ is relatively large but within a more reasonable range. It may be because education is a better instrument for income in the case of non-durable expenditures, compared to food expenditures. For instance, households with more educated parents are likely to spend more on children's education, although they may not necessarily spend more on food. The estimated tax evasion rate is slightly lower than in the case of OLS, at 14 per cent, on average, and with a range of 11 to 20 per cent, depending on taxpayer perception.

Table 3. Estimation results: log of non-durable expenditures as dependent variable

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV
able		0.0693***		0.0909***	
		(0.00475)		(0.00543)	
able but unwilling $\hat{\gamma}$			0.0381***		0.0700***
			(0.00552)		(0.00671)
able and willing $\hat{\delta}$			0.131***		0.130***
			(0.00697)		(0.00722)
log(income) $\hat{\beta}$	0.321***	0.329***	0.323***	0.608***	0.593***
	(0.006)	(0.00588)	(0.00588)	(0.0231)	(0.0239)
Observations	23 913	23 913	23 913	23 913	23 913
R-squared	0.318	0.324	0.328	0.254	0.263

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. OLS, ordinary least squares; IV, instrumental variable.

	$\hat{k}$	$1 - \hat{k}$
OLS		
able	0.810	0.190
able but unwilling	0.889	0.111
able and willing	0.667	0.333
IV		
able	0.861	0.139
able but unwilling	0.889	0.111
able and willing	0.803	0.197

Note: $\hat{k}$ is the general term for the fraction of the true income which is declared.

Taxpayer perception based on an alternative measure

As noted in section II, there are different ways to measure taxpayer perception. Compared to the main result, which is based on the latent variable approach, here an alternative measure based on the following hypothetical situation is used: "If you have rent income which the tax authorities cannot observe, would you declare the full amount?" Those who indicate "Yes, all of the income" are defined as "unwilling" to cheat, while those who indicate "There is no need to declare if the amount is small" or "Declare none in any case" are defined as the "willing" to cheat. The sample size is almost double as compared to earlier specifications, as no observations are dropped to define willingness.

Table 4. Estimation results: alternative measure of willingness to cheat

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV
able		0.0462***		0.0866***	
		(0.00408)		(0.00492)	
able but unwilling $\hat{\gamma}$			0.0390***		0.0745***
			(0.00539)		(0.00613)
able and willing $\hat{\delta}$			0.0518***		0.0938***
			(0.00524)		(0.00609)
log(income) $\hat{\beta}$	0.372***	0.377***	0.377***	0.839***	0.840***
	(0.005)	(0.00509)	(0.00509)	(0.0211)	(0.0211)
Observations	49 300	49 300	49 300	49 300	49 300
R-squared	0.284	0.286	0.286	0.150	0.150

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. OLS, ordinary least squares; IV, instrumental variable.

	$\hat{k}$	$1 - \hat{k}$
OLS		
able	0.885	0.115
able but unwilling	0.902	0.098
able and willing	0.872	0.128
IV		
able	0.902	0.098
able but unwilling	0.915	0.085
able and willing	0.894	0.106

Note: $\hat{k}$ is the general term for the fraction of the true income which is declared.

Table 4 shows the estimation results for food Engel curve. $\hat{\beta}$, is stable across different specifications, with a 1 per cent increase in income resulting in just below a 0.4 per cent increase in food expenditures based on the OLS estimator. With taxpayer perception in column 3, essentially the same trend is established as in the latent variable approach, although the willingness to cheat now explains a much smaller portion of the overall variation. The difference between the "unable" and the "able" to cheat is much more significant compared to perception differences within the "able" to cheat. This seems to confirm the suspicion why anyone would reveal information which might be used against them.

XI. CONCLUSION

In this paper, the question of why people cheat in the context of income tax evasion is examined. The standard expected utility model of tax evasion posits that people cheat if the chances of getting caught and punished are quite low. Given that this information asymmetry between taxpayer and the tax authority plays a key role, many countries have introduced third-party reporting schemes to complement the traditional audit in increasing the probability of detection. Such efforts have improved tax compliance in many cases, but only up to a certain extent. The remaining "residual" may be more difficult to explain and requires a deeper understanding of the human behaviour.

The possibility that people are "able" and yet "unwilling" to cheat the government because they feel fairly treated is explored in this paper. While this is a plausible argument, empirically testing it is not so straightforward. Using the consumption-based method for estimating income tax evasion, this paper provides a way to tackle the issue. Based on an illustrative case of the Republic of Korea, taxpayer perception matters, and in some cases monetary returns may play a relatively minor role in determining tax evasion, unlike in the case of the standard, expected utility model.

The policy implication is that, for curbing tax evasion, voluntary compliance measures and appropriate changes to a tax law may be just as necessary as third-party reporting and other enforcement measures. An optimal strategy for improving compliance may be to target the extensive and the intensive margins: foster social and cultural norms for compliance, while making cheating more difficult for those who are persistently inclined to cheat.

ANNEX I. FULL ESTIMATION RESULTS

Table A.1. Estimation results: log of food expenditures as dependent variable

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV
able		0.0554***		0.0922***	
		(0.00582)		(0.00698)	
able but unwilling			0.0261***		0.0819***
			(0.00680)		(0.00865)
able and willing			0.113***		0.111***
			(0.00851)		(0.00928)
log(income)	0.387***	0.393***	0.387***	0.866***	0.858***
	(0.007)	(0.00734)	(0.00737)	(0.0295)	(0.0305)
family size	0.076***	0.0761***	0.0766***	0.0543***	0.0547***
	(0.004)	(0.00357)	(0.00355)	(0.00383)	(0.00384)
capital city	0.215***	0.210***	0.206***	0.179***	0.178***
	(0.007)	(0.00690)	(0.00688)	(0.00818)	(0.00809)
home ownership	0.010*	0.0104*	0.0101*	-0.0372***	-0.0368***
	(0.006)	(0.00591)	(0.00590)	(0.00704)	(0.00705)
age	0.034***	0.0327***	0.0332***	0.00620	0.00669*
	(0.003)	(0.00312)	(0.00314)	(0.00378)	(0.00382)
age squared	-0.000***	-0.000335***	-0.000338***	-0.000105***	-0.000108***
	(0.000)	(3.34e-05)	(3.35e-05)	(3.94e-05)	(3.96e-05)
education	0.081***	0.0855***	0.0825***		
	(0.005)	(0.00512)	(0.00513)		
hours worked	-0.001***	-0.00160***	-0.00174***	-0.00107***	-0.00112***
	(0.000)	(0.000274)	(0.000274)	(0.000301)	(0.000304)
2009.year	0.000	-2.97e-05	-0.000688	-0.0128	-0.0129
	(0.011)	(0.0110)	(0.0110)	(0.0120)	(0.0120)
2010.year	0.069***	0.0686***	0.0686***	0.0486***	0.0489***
	(0.011)	(0.0108)	(0.0108)	(0.0120)	(0.0120)
2011.year	0.066***	0.0661***	0.0659***	0.0162	0.0168
	(0.011)	(0.0108)	(0.0108)	(0.0123)	(0.0123)
2012.year	0.168***	0.169***	0.169***	0.120***	0.121***
	(0.011)	(0.0108)	(0.0108)	(0.0123)	(0.0123)
2013.year	0.160***	0.163***	0.162***	0.106***	0.107***
	(0.011)	(0.0108)	(0.0108)	(0.0125)	(0.0125)
2014.year	0.197***	0.199***	0.199***	0.134***	0.135***
	(0.011)	(0.0109)	(0.0109)	(0.0127)	(0.0127)
Constant	2.060***	2.028***	2.074***	-0.965***	-0.913***
	(0.084)	(0.0835)	(0.0836)	(0.212)	(0.219)
Observations	23 946	23 946	23 946	23 946	23 946
R-squared	0.282	0.284	0.287	0.144	0.149

Note: OLS, ordinary least squares; IV, instrumental variable.

Table A.2. Estimation results: log of non-durable expenditures as dependent variable

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV
able		0.0693***		0.0909***	
		(0.00475)		(0.00543)	
able but unwilling			0.0381***		0.0700***
			(0.00552)		(0.00671)
able and willing			0.131***		0.130***
			(0.00697)		(0.00722)
log(income)	0.321***	0.329***	0.323***	0.608***	0.593***
	(0.006)	(0.00588)	(0.00588)	(0.0231)	(0.0239)
family size	0.092***	0.0914***	0.0919***	0.0785***	0.0794***
	(0.003)	(0.00281)	(0.00279)	(0.00298)	(0.00298)
capital city	0.183***	0.178***	0.173***	0.159***	0.157***
	(0.006)	(0.00565)	(0.00561)	(0.00633)	(0.00624)
home ownership	-0.010**	-0.00960*	-0.00998**	-0.0377***	-0.0368***
	(0.005)	(0.00491)	(0.00489)	(0.00559)	(0.00558)
age	0.048***	0.0471***	0.0477***	0.0315***	0.0325***
	(0.003)	(0.00262)	(0.00263)	(0.00300)	(0.00303)
age squared	-0.000***	-0.000466***	-0.000469***	-0.000329***	-0.000337***
	(0.000)	(2.80e-05)	(2.81e-05)	(3.14e-05)	(3.15e-05)
education	0.045***	0.0505***	0.0472***		
	(0.004)	(0.00415)	(0.00415)		
hours worked	-0.000	-0.000763***	-0.000907***	-0.000453*	-0.000558**
	(0.000)	(0.000231)	(0.000230)	(0.000245)	(0.000245)
2009.year	0.006	0.00564	0.00487	-0.00172	-0.00191
	(0.009)	(0.00885)	(0.00883)	(0.00938)	(0.00932)
2010.year	0.055***	0.0548***	0.0547***	0.0432***	0.0436***
	(0.009)	(0.00874)	(0.00873)	(0.00937)	(0.00931)
2011.year	0.074***	0.0741***	0.0738***	0.0449***	0.0459***
	(0.009)	(0.00875)	(0.00874)	(0.00958)	(0.00954)
2012.year	0.133***	0.134***	0.134***	0.105***	0.106***
	(0.009)	(0.00874)	(0.00872)	(0.00962)	(0.00957)
2013.year	0.130***	0.133***	0.133***	0.0998***	0.101***
	(0.009)	(0.00873)	(0.00872)	(0.00974)	(0.00971)
2014.year	0.151***	0.154***	0.154***	0.116***	0.117***
	(0.009)	(0.00885)	(0.00884)	(0.00997)	(0.00995)
Constant	2.701***	2.661***	2.710***	0.895***	1.000***
	(0.071)	(0.0704)	(0.0702)	(0.168)	(0.172)
Observations	23 913	23 913	23 913	23 913	23 913
R-squared	0.318	0.324	0.328	0.254	0.263

Note: OLS, ordinary least squares; IV, instrumental variable.

Table A.3. Estimation results: alternative measure of willingness to cheat

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV
able		0.0462***		0.0866***	
		(0.00408)		(0.00492)	
able but unwilling			0.0390***		0.0745***
			(0.00539)		(0.00613)
able and willing			0.0518***		0.0938***
			(0.00524)		(0.00609)
log(income)	0.372***	0.377***	0.377***	0.839***	0.840***
	(0.005)	(0.00509)	(0.00509)	(0.0211)	(0.0211)
family size	0.079***	0.0792***	0.0790***	0.0522***	0.0519***
	(0.002)	(0.00229)	(0.00229)	(0.00258)	(0.00259)
capital city	0.187***	0.186***	0.187***	0.143***	0.143***
	(0.005)	(0.00475)	(0.00475)	(0.00588)	(0.00588)
home ownership	0.007	0.00685*	0.00686*	-0.0366***	-0.0368***
	(0.004)	(0.00410)	(0.00411)	(0.00487)	(0.00487)
age	0.041***	0.0392***	0.0395***	0.0172***	0.0177***
	(0.002)	(0.00219)	(0.00218)	(0.00262)	(0.00260)
age squared	-0.000***	-0.000415***	-0.000417***	-0.000224***	-0.000227***
	(0.000)	(2.33e-05)	(2.32e-05)	(2.73e-05)	(2.72e-05)
education	0.078***	0.0810***	0.0812***		
	(0.004)	(0.00356)	(0.00356)		
hours worked	-0.000	-0.000526***	-0.000520***	0.000459**	0.000486**
	(0.000)	(0.000181)	(0.000181)	(0.000207)	(0.000208)
2009.year	0.013*	0.0124*	0.0124*	0.000763	0.000746
	(0.007)	(0.00748)	(0.00748)	(0.00815)	(0.00815)
2010.year	0.068***	0.0678***	0.0676***	0.0442***	0.0437***
	(0.007)	(0.00748)	(0.00748)	(0.00828)	(0.00829)
2011.year	0.070***	0.0707***	0.0705***	0.0170**	0.0164*
	(0.007)	(0.00741)	(0.00741)	(0.00856)	(0.00857)
2012.year	0.171***	0.172***	0.171***	0.112***	0.111***
	(0.007)	(0.00743)	(0.00743)	(0.00867)	(0.00868)
2013.year	0.163***	0.165***	0.164***	0.0961***	0.0950***
	(0.007)	(0.00741)	(0.00741)	(0.00889)	(0.00890)
2014.year	0.201***	0.203***	0.203***	0.124***	0.123***
	(0.007)	(0.00741)	(0.00742)	(0.00911)	(0.00912)
Constant	1.999***	1.986***	1.982***	-1.042***	-1.057***
	(0.059)	(0.0591)	(0.0591)	(0.154)	(0.154)
Observations	49 300	49 300	49 300	49 300	49 300
R-squared	0.284	0.286	0.286	0.150	0.150

Note: OLS, ordinary least squares; IV, instrumental variable.

ANNEX II. ENGEL CURVE ESTIMATION IN PISSARIDES AND WEBER (1989)

For household *i*, let C_i stand for the expenditure share of food and Y_i^P the permanent income that influences consumption decisions. Z_i is a vector of household characteristics.

$$lnC_i = Z_i\alpha + \beta lnY_i^P + \varepsilon_i$$

The true income Y_i is a function of the reported income Y_i' and the permanent income

$$Y_i = k_i Y_i'$$

$$Y_i = p_i Y_i^P,$$

where $k_i \geq 1$ and p_i are random variables showing the degree of underreporting and the degree of transitory income variation, respectively. Note that $k_i = 1$ for employees. The distinction between permanent and transitory income may seem redundant, but it could be important, as it is likely that the covariance of underreporting and transitory income is not zero. If an individual has had an exceptionally good year in self-employment income, he may be less inclined to declare the full income, as it may arouse the curiosity of the tax authority. The mean of p_i is assumed to be the same for both groups, although the variance may differ. k_i and p_i are assumed to be log normal,

$$lnk_i = \mu_k + v_i$$

$$lnp_i = \mu_p + u_i$$

with errors that have zero mean and constant variances σ_v^2 and σ_u^2. Substitution gives

$$lnC_i = Z_i\alpha + \beta lnY_i' - \beta lnp + \beta lnk_i + \varepsilon_i$$

$$lnC_i = Z_i\alpha + \beta lnY_i' + \beta\left(\mu_k - \mu_p\right) + \beta(v_i - u_i) + \varepsilon_i$$

Let SE_i be a dummy taking the value one if the household is self-employed, and zero if not, and SE and EE stand for the two groups. Then,

$$lnC_{ij} = Z_i\alpha_j + \beta_j lnY_i' - \gamma_j SE_i + \eta_i$$

where $\gamma = \beta\left[\left(\mu_{kSE} - \mu_{kEE}\right) - \left(\mu_{pSE} - \mu_{pEE}\right)\right] = \beta[\mu_{kSE} + \frac{1}{2}(\sigma_{uSE}^2 - \sigma_{uEE}^2)]$

This provides a rough estimate of underreporting, as $lnk = \gamma/\beta$. The mean of the underreporting component can be derived as

$$ln\bar{k} = \mu_{kSE} + \frac{1}{2}[\sigma^2_{vSE} - (\sigma^2_{uSE} - \sigma^2_{uEE})]$$

Pissarides and Weber (1989) introduce a reduce form equation out of concern for endogeneity, but also to gain an independent estimate of the variances of underreporting and transitory income.

$$lnY_i' = Z_i\delta_1 + X_i\delta_2 + \tau_i$$

where X_i is a set of identifying instruments. Here, the error term consists of deviations of actual from permanent income and actual from reported income as well as the unexplained variation in permanent income. The residual variances for the two groups are related by

$$\sigma^2_{\tau SE} - \sigma^2_{\tau EE} = \sigma^2_{vSE} + (\sigma^2_{uSE} - \sigma^2_{uEE}) - 2cov(uv)_{SE}$$

The lower ($\sigma^2_{vSE} = 0$) and upper ($\sigma^2_{uSE} = \sigma^2_{uEE}$) bounds give an interval, whose mid-point is reported in Pissarides and Weber (1989).

$$ln\bar{k} \in [\frac{\gamma}{\beta} - \frac{1}{2}(\sigma^2_{\tau SE} - \sigma^2_{\tau EE}) + cov(uv)_{SE}\ ,\ \frac{\gamma}{\beta} + \frac{1}{2}(\sigma^2_{\tau SE} - \sigma^2_{\tau EE}) + cov(uv)_{SE}]$$

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CONTRIBUTORY FACTORS TOWARDS SUSTAINABILITY OF BANK-LINKED SELF-HELP GROUPS IN INDIA

*Disha Bhanot and Varadraj Bapat**

The present study focuses on the Indian flagship financial inclusion scheme – the Self Help Group-Bank Linkage Programme, which successfully leverages the social collateral concept and the vast network of bank branches in India to deliver financial services to small, cohesive and participatory women's self-help groups. To develop a deeper understanding of the topic of sustainability of self-help groups, we propose a framework that conceptualizes sustainability by integrating the financial and organizational aspects of functioning of self-help groups. Sustainability is assessed in the light of the group's performance (on set of indicators) with respect to the primary objective of the Self Help Group-Bank Linkage Programme, which is financial intermediation. Subsequently, we ascertain the effect of plausible contributory factors related to group management practices on the sustainability of self-help groups. The results of regression analysis on primary data captured from a survey of 170 self-help groups show that such factors as equitable access to credit, group savings, growth in savings, loan utilization in income generation activities, members depositing a savings contribution or loan installment on each other's behalf, and distance from bank contribute significantly to group sustainability. Accordingly, designing suitable measures to monitor and improve group governance and management practices would be a critical policy intervention.

JEL classification: G21

Keywords: financial inclusion, self-help groups, Self Help Group-Bank Linkage Programme, sustainability, bank credit, India

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I. INTRODUCTION

Approximately 1.7 billion working age adults remain financially excluded globally and almost all of these unbanked adults live in developing countries (Demirgüç-Kunt and others, 2018). In the light of the financial exclusion faced by the world's vulnerable and marginalized population, providing financial services to them is a policy priority of many governments. In addition, financial inclusion is positioned as an enabler of the 2030 Sustainable Development Goals.[1] Even though the Goals do not explicitly target financial inclusion, greater access to financial services has a significant role to play in attaining many of them, including those aimed at reducing poverty, creating jobs and improving gender equality (Klapper, EL-Zoghbi and Hess, 2016), and is also known to positively contribute to a country's financial stability (Siddik and Kabiraj, 2018). Based on this background, the focus of this study is on the Indian flagship financial inclusion programme – the Self Help Group-Bank Linkage Programme.

The Committee on Financial Inclusion in India has defined financial inclusion as "the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups, such as weaker sections and low-income groups at an affordable cost" (Rangarajan, 2008). The poor face significant problems in obtaining access to institutional credit because they have no collateral and formal financial institutions commonly categorize them as a high-cost and high-risk segment of the population (Morduch, 1999). The problem is further accentuated in the presence of acute information asymmetry[2] between financial institutions and poor borrowers. Previous studies have documented significant disparity in the access and the use of financial services by gender (Ghosh and Vinod, 2017; Swamy, 2014). Worldwide, most unbanked adults are women, and especially in developing economies, women remain less likely (than men) to have a bank account (Demirgüç-Kunt and others, 2018).[3] In fact, women in developing countries disproportionately face systemic barriers in accessing financial services because of social norms and a strong bias of inheritance laws against women, and a gender bias in land and property registration, among other factors (Fletschner and Kenney, 2014). For the same reason, microfinance interventions carried out around the world have exclusively focused on women clients; approximately

[1] The Sustainable Development Goals, comprising of 17 ambitious goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty in all of its forms by 2030.

[2] Information asymmetry refers to the problem of adverse selection in which financial institutions cannot screen riskier customers from safer ones and moral hazard in which financial institutions cannot monitor the behaviour of the borrower (Sriram, 2005).

[3] For instance, Demirgüç-Kunt and others (2014) noted that in 2014, 63 per cent of Indian men had an account at formal financial institution, as compared to 43 per cent for women.

80 per cent of all microfinance clients are women (Reed, 2015; Cull, Demirgüç-Kunt and Morduch, 2009). Various studies suggest that the impact of microcredit is known to be greater when credit is targeted to women, and that empowering women with access to financial resources serves as a vital tool for alleviating poverty (Sustainable Development Goal 1) and promoting gender equality (Sustainable Development Goal 5) (Hulme and Mosley, 1996; Kabeer, 2003; Pitt, Khandker and Cartwright, 2006). Women are also perceived to be more responsible, regular and disciplined when it comes to repaying loans. Given that they have lower mobility and fewer alternative borrowing possibilities at their disposal, especially in developing economies, this ensures high repayment rates on loans extended to them (Morduch, 1999).

In the light of the constraints to financial inclusion, especially those experienced by poor marginalized women, the financial needs of women must be addressed in unique ways. One such innovative approach to include the previously excluded and marginalized women population into the mainstream banking channel (while bringing about poverty reduction) is the Self Help Group-Bank Linkage Programme of India. As part of the Programme, groups of poor and marginalized members (referred as to self-help groups)[4] pool their savings on a regular basis and rotate pooled savings as loans within group members at unanimously decided interest rates. During that process, the members learn the nuances of financial discipline and the basics of financial management. Self-help groups are entitled to open savings accounts with a bank and after establishing their credibility (as bankable entities), they can access collateral-free institutional loans from banks. Replacing the traditional collateral, self-help groups effectively leverage the social collateral concept, which considers social ties, along with peer pressure and peer dynamics, to serve as an assurance that loan recipients will not be delinquent in repayments (Armendáriz and Morduch, 2010). Since its pilot, implemented by the National Bank for Agriculture and Rural Development in 1992, the Self Help Group-Bank Linkage Programme has become the largest community-based microfinance initiative in India – covering approximately 120 million households through 10 million bank-linked self-help groups holding deposits that exceed 230 billion Indian rupees (Rs) ($3.22 billion) and being advanced annual credit of Rs580 billion by banks on the strength of social collateral (National Bank for Agriculture and Rural Development, 2019). In serving the high volume and low margin customers, the Self

[4] Self-help groups work as a voluntary group of 10 to 20 members and are usually homogeneous in terms of socioeconomic background, caste and occupation. They are formed by promoting institutions, such as non-governmental organizations, banks, federations and microfinance institutions. There are three distinct models of the Self Help Group-Bank Linkage Programme: (a) self-help groups being bank-linked with active support from promoting institution, typically a non-governmental organization; (b) self-help groups being promoted and financed by banks; and (c) a promoting institution (typically a microfinance institution taking the role as financial intermediary between the banks and self-help groups). In India, almost 75 per cent of cumulative loans by banks have been disbursed under the first model. In addition, as of March 2019, 85 per cent of the self-help groups in India were all women groups and almost 80 per cent were located in rural areas (National Bank for Agriculture and Rural Development, 2019).

Help Group-Bank Linkage Programme has also proved to be cost-effective for banks, as the operational cost for a group of borrowers (through a single self-help group account) is much less than that for a large number of small-sized individual accounts (Dave and Seibel, 2002). Lending to self-help groups is also recognized as part of priority sector lending[5] by the Reserve Bank of India.

The potential of the self-help group bank linkage programme in reducing the incidence of poverty through an increase in income and building assets, and going beyond financial service provision to bring about socioeconomic benefits, such as empowering women, securing livelihoods and reviving local economies, has been well documented and reflected upon in various studies (Basu and Srivastava, 2005; Deininger and Liu, 2013; Garikipati, 2008; Holvoet, 2005; Nair, 2014; Swain and Varghese, 2009).[6] However, of late, there are rising concerns about the sustainability of self-help groups being affected by a number of factors, including, among them, irregular savings, dwindling membership, rising loan defaults, inability to access credit (typically repeat bank loans), poor record keeping, limited credit absorption capacity and excessive reliance on promoting institutions (Baland, Somanathan and Vandewalle, 2008; Isern and others, 2007; Parida and Sinha, 2010; Rao, 2009; Reddy and Reddy, 2012; Tankha, 2002). Given that self-help groups play an important role – not just as financial intermediaries, but also as agents of social change – the sustainability of these groups is of concern not only for end-beneficiaries, but also for donor agencies, practitioners and policymakers. Moreover, if self-help members are to derive positive benefits from a group membership on an ongoing basis, then it is important that the group "sustains" itself. In other words, sustainability is argued to be a prerequisite for the continued impact of microfinance on the poor (Zohir and Matin, 2004).

In the context of self-help groups, sustainability has been viewed in different ways by different authors. In some studies, sustainability has been operationalized as the long-term financial viability of the groups (Chavan and Ramakumar, 2002; Isern and others, 2007; Pati, 2009); others regard long-term linkage with the financial institutions

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[5] Priority sector lending is aimed towards mandating the banks to provide a specified portion of bank lending to weaker sections of society, such as agriculture and allied activities, micro and small enterprises, self-help groups, housing and education. Individual women beneficiaries with a cap of Rs100,000 per borrower also fall under the scope of priority sector lending. Details on priority sector lending guidelines for Indian banks can be accessed at https://m.rbi.org.in/Scripts/FAQView.aspx?Id=87#targetText=Loans%20to%20individuals%20up%20to,and%20%E2%82%B9%203%20million%2C%20respectively.

[6] Bhatt (2005), Parthasarathy, Thekkekara and Poonacha (2011) and Premchander and others (2009) provide an interesting compilation of stories of women, who have courageously fought for human dignity, self-reliance and socioeconomic empowerment. Benni and Barkataky (2018) have also reflected on the efforts of the Self Employed Women's Association in India – a registered trade union that organizes poor, self-employed women workers with the objective to achieve financial empowerment of women through institutionalizing the provision of credit through self-help groups.

as a benchmark of sustainability (Bhatia, 2007); few relate it to the groups being well managed and their corresponding financial and institutional performance (Dave and Seibel, 2002; Shetty, 2009, Srinivasan, 2008); and some perceive sustainability as the ability to function without dependence on promoting institution and higher level structures, such as federations[7] (Nair, 2005; Parida and Sinha, 2010; Reddy and Prakash, 2003). Although the sustainability of self-help groups has been studied by several authors in a myriad of insightful ways, there seems to be no unanimity on the conceptual framework for understanding the phenomenon of sustainability. Previous studies have also articulated the need for a comprehensive and grounded assessment of sustainability of groups (Fernandez, 2008; Nair, 2005; Shetty, 2009; EDA Rural Systems and APMAS, 2006). The present study has been conceptualized in cognizance of this need.

In this study, we attempt to elucidate the semantics of the sustainability of self-help groups by addressing two research questions: (a) What could be the indicators of sustainability for a sustainable self-help group?; and (b) What leads to sustainability? In addressing the first question, tangible indicator(s) are used to assess the sustainability of self-help groups in the light of the group's performance with respect to the primary objective of the Self Help Group-Bank Linkage Programme, which is financial intermediation. Regarding the second research question, we aim to ascertain the effect of potential drivers of sustainability of self-help groups on each of the sustainability indicators using regression analysis on primary data collected from self-help groups in the western state of Maharashtra, India. The potential drivers or factors affecting sustainability relate to the governance mechanisms around group management practices of self-help groups. The findings would serve to provide "how-to" lessons for improving the sustainability of microfinance groups.

The rest of the paper is structured as follows: Section II contains a brief discussion on the relevant literature on the topic of sustainability of self-help groups followed by a review of the selected sustainability indicators and the plausible contributory factors affecting sustainability. The hypothesized effect of the selected contributory factors on each of the sustainability indicators is discussed in section III. In section IV, a description of sample data and the research methodology is given. The results from econometric analysis of data are presented in section V. Section VI includes a discussion of the findings and suggested policy implications from the study and section VII concludes.

[7] A self-help group federation is a network of several self-help groups formed to facilitate the promotion of such groups, and to enhance access to credit and provide other financial, technical and marketing services to them.

II. SUSTAINABILITY INDICATORS AND CONTRIBUTORY FACTORS

A majority of the studies in the microfinance literature dealing with the topic of sustainability of self-help groups have operationalized sustainability across two main dimensions – financial sustainability, and organizational and institutional sustainability. Financial sustainability concerns matters related to thrift and savings management, group's access to credit, credit rotation, and recovery and repayment of credit (Deininger and Liu, 2009; Mawire, 2012; Sharma, 2017; Tankha, 2002), while organizational and institutional sustainability captures groups' governance processes and is broadly assessed by monitoring the quality of groups based on various indicators, including, among them, frequency and attendance of meetings, mechanism of record keeping, conflict resolution capacity, development of financial and non-financial skills and quality of leadership (Reddy and Reddy, 2012; Seibel, 2006; Shetty, 2009). As previously discussed, this study is intended to address two research questions: (a) What could be the indicators of sustainability for a sustainable self-help group?; and (b) What leads to sustainability? In response to the first research question, the approach of Lele (1993) is used to identify the plausible indicators of group sustainability. As per this approach, sustainability of a given programme or intervention can be defined in line with the objectives of the programme at hand. Self-help groups are mainly formed for the purpose of financial intermediation, and therefore, ensuring access to credit from internal and external sources remains the central objective of the self-help bank linkage programme. Based on this, the following are considered the three main sustainability indicators of self-help groups: intra-lending; frequency of bank credit; and the amount of bank credit.

The choice of the above-mentioned indicators is aligned with the literature on financial sustainability of self-help groups. The mainstream literature related to the topic of sustainability in the context of microfinance has attached emphasis (though unwarranted) on the loan-repayment performance of the borrower (Deininger and Liu, 2009; Mawire, 2012; Sharma, 2017; Sharma and Zeller, 1997), which places lender's interest at the core. In contrast, this study offers a fresh perspective on sustainability – from the point of view of the borrower. The sustainability indicators are predominantly group centric and assist in ascertaining whether the self-help groups can achieve their primary intended role as financial intermediaries. The significance of each of the sustainability indicators is discussed below:

(a) *Intra-lending:* Intra-lending or intra-group loans refer to the process of self-help group members accessing loans against pooled group savings at pre-decided and unanimously accepted interest rates (typically between 2 and 3 per cent per month).[8] In the process of intra-lending, members learn

[8] The interest received on the credited amount remains with the group and is used for further intra-lending.

the importance of financial discipline, which later forms the basis of establishing the group's credibility in accessing bank loans. Intra-group loans, often characterized by their small size, are mostly extended to members for their day-to-day personal needs, such as for consumption smoothing and paying children's educational expenditures, and to serve as a social insurance mechanism to cover themselves against possible shocks or risks to their income arising from sickness or death of a family member. In fact, the extent of intra-lending also serves as a proxy for the group's repayment performance, as the group cannot continue to intra-lend and be sustainable if members frequently default on internal loans. EDA Rural Systems and APMAS (2006) have documented default on intra-group loans as the most common reason for groups to break up. Against this backdrop, intra-lending, measured as the cumulative amount internally lent among the group members since inception, is considered as a critical sustainability indicator.

(b) *Frequency of bank credit:* One of the key objectives of the Self Help Group-Bank Linkage Programme is to reduce the credit dependence of the poor on non-institutional sources; accordingly, it is vital that self-help groups are able to access credit from formal sources, such as banks, on a continuing basis. The frequency of bank borrowings not only reflects the credit worthiness of the self-help group, but it also implies that the group finds it fruitful to obtain bank credit again. Several groups, however, have difficulty in accessing repeat bank loans (Bhatia, 2007). In addition, the overall number of self-help groups attaining bank credit has also remained low.[9] In pursuit of sustainability, it is important that groups are able to access repeat bank loans, as per their need. Inability to access institutional credit raises the likelihood that a group will close (Srinivasan, 2008). Accordingly, the ability of a group to access bank credit on a continuous basis is regarded as a critical sustainability indicator.

(c) *Amount of bank credit:* In the initial years of a self-help group, banks extend small loan amounts to them and upon satisfactory repayment, larger loans are extended. This mechanism of assuring new, additional larger loans if prior loans are repaid, is known as "progressive lending", which is a function of group's performance on a variety of factors including, among them, regularity of savings, discipline in intra-lending, repayment of prior loans and efficacy in record keeping (Morduch, 1999). A progressive lending mechanism serves as an effective instrument for ensuring repayment under group lending programmes by expanding the opportunity cost of non-repayment of loan and

[9] As per report on the status of microfinance in India in 2018, out of almost 10 million self-help groups, only about 51 per cent have credit outstanding ((National Bank for Agriculture and Rural Development, 2019).

thereby discouraging strategic default (Kumar, 2012). Bank credit is typically used to purchase assets for personal use or for investment in income generation activities.[10] As loans from banks can be obtained at lower interest rate (compared to usurious interest rates on loans from informal sources), to support the sustainability of self-help groups, a large chunk of their credit requirements should be met from banks. Based on this, the amount of bank credit availed by the group since inception is considered a critical indicator of the sustainability of self-help groups.

Having identified the sustainability indicators of self-help groups, the next step is to identify the potential drivers and factors affecting group sustainability. This is important because sustainability indicators, described above, by themselves tell little as to "why" self-help groups are operating or not operating in a sustainable manner. Towards this end, we posit that the group management practices or processes (captured under the organizational sustainability dimension of self-help groups), concerning how self-help groups function, how they work as a cohesive unit, how they manage their day-to-day affairs and how they distribute and use their loans, and other various aspects of group functioning, are requirements or potential drivers for achieving sustainability. In the context of this study, the following is a set of variables seen as plausible contributory factors towards sustainability of self-help groups:

(a) *Group savings:* Self-help group members save a pre-decided amount of contribution periodically and gradually build up the group corpus that is used for lending within the group. The group savings also serves as a collateral substitute (Morduch, 1999), and typically banks extend loans to self-help groups in proportion of their cumulative savings.

(b) *Equitable access to credit:* Ensuring equitable access to credit is an important driver of sustainability, as an unequal distribution of loans not only constitutes a threat to a group's democratic functioning, but it also often leads to a group's premature demise (Thekkekara, 2011).

(c) *Group cohesion:* Cohesiveness among group members is a key driver of sustainability, as it enables the self-help group to remain united in pursuit of its goals and objectives. Absence of cohesion is reflected by member attrition, which is one of the major reasons behind a group's closure (Baland, Somanathan and Vandewalle, 2008).

[10] While formal and informal sources of finance coexist in the form of bank loans and intra-lending, respectively, there are differences in loan utilization patterns for bank loans vis-à-vis intra-group loans. Additionally, unlike intra-group loans, a bank loan amount is typically larger in size. Moreover, the frequency in which members are able to access bank loans vis-à-vis intra-group loans also differs markedly (the former being lower than the latter).

(d) *Paying on each other's behalf:* The phenomenon of self-help group members paying a savings contribution or a loan installment on each other's behalf, particularly in times of need, is referred to as intra-group insurance by Verhelle and Berlage (2003) and as social empathy ("the ability to imagine oneself in the shoes of others") by Bardhan (1993). This practice helps the group to maintain regularity of savings while also preserving its credibility in the eyes of the banks.

(e) *Loan utilization for income generation activity:* The growth-trajectory of self-help groups, as conceived by policymakers, non-governmental organizations, government and banks, is to initially help group members meet their core needs of savings and credit for consumption and gradually enable the group to set up their own microenterprises and subsequently take up loans to support their income generation activities (Kashyap, 2008). Using loans for income generation activities not only increases the likelihood of a group accessing larger loan amounts (from internal and external sources), but it also offers better earning opportunities to self-help group members, while enabling the group be a source of job creation in their communities (Guha and Gupta, 2005).

(f) *Signing financial records:* Self-help groups maintain financial records to document the group's financial transactions and activities. The records are comprised of the collection of member savings, disbursal of credit among members and the collection of loan repayment. The practice of group members signing against group's financial records helps to maintain accountability and transparency in functioning, and is therefore an important contributory factor towards achieving the sustainability of self-help groups (Isern and others, 2007).

(g) *Growth in savings:* When a self-help group is established, the members decide to save a fixed amount to their group corpus on a regular basis. Some groups continue to save the same amount over the years, while others increase their savings contribution after a few years. Committing to an increased savings contribution is indicative that members are able to appreciate the benefits of the saving mechanism. In addition, a positive trend in growth of group savings not only increases the group's corpus fund, but it also makes the group eligible for larger bank loans, in line with the increased pooled savings (Misra and Lee, 2007).

(h) *Training for skill building:* Self-help groups are exposed to a range of different capacity-building interventions or trainings. While the general training includes basic literacy, book keeping, group formation, leadership development and group dynamics, the skill building training is primarily administered to more mature groups and is aimed at encouraging members to initiate income generation activities. Skill building trainings, in particular

those that the members explicitly request based on their interests and skills, are likely to affect group sustenance in a positive manner (Mann and Randhawa, 2015; Reddy and Reddy, 2012).

(i) *Homogeneity:* Homogeneity in group composition implies sharing common socioeconomic characteristics across a variety of indicators, such as age, education, marital status, caste and occupation. It is expected that in homogeneous groups, information asymmetry is lower (Stiglitz, 1990; Devereux and Fishe, 1993) and accordingly, group sustainability is favourably affected. Furthermore, if members come from similar social and financial backgrounds, there would be an equal opportunity of self-expression among them (Parida and Sinha, 2010).

In addition to the above factors, the effect of the distance variable (distance from a bank) and group size on the sustainability of a self-help group is also controlled for. Distance from a banking service is as an important determinant of access to institutional credit – with increasing physical distance being a commonly reported barrier to access (Demirgüç-Kunt and others, 2018). Similarly, group size affects the cost of monitoring and coordinating meetings. In previous studies, it has been documented that larger groups perform better because they are more likely to take advantage of economies of scale (by serving bulk orders for their collective microenterprises) and also because of the prevalence of intra-group insurance (Godquin, 2004; Zeller, 1998).

To summarize, the choice of sustainability indicators in this study is such that sustainability is viewed as the group's access to internal and external financing, corresponding to intra-lending and bank loan, respectively, while the factors affecting group's sustainability are those that are concerned with the functioning of self-help groups and their group management practices. To the best of our knowledge, this study is novel in conceptualizing sustainability by integrating the financial and organizational aspects of the functioning of self-help groups. This research is motivated by the need to deepen the understanding of the phenomenon of the sustainability of self-help groups. Such need is situated in the light of the concerns about the self-help groups in India as reflected by lack of transparency, multiplicity of membership, quality issues, manual book keeping and unavailability of credit history of members. Theory testing is therefore not the primary objective of the study. Consequently, framing of the hypothesized relation between the set of sustainability indicators and the factors affecting sustainability is grounded in the field work and interaction with self-help group members, practitioners, banks and non-governmental organizations and not in any specific theory per se.[11]

[11] Helfat (2017) provides a coherent argument for using empirical research to investigate a real-world phenomenon, especially in the discipline of management science, rather than giving excessive emphasis on theory testing.

III. FACTORS AFFECTING THE SUSTAINABILITY OF SELF-HELP GROUPS

Given that in this study, the sustainability of self-help groups is assessed across three tangible indictors. In this section, we hypothesize the effect of a set of group management practices on each of the sustainability indicators.

Potential determinants of intra-lending

The set of factors affecting group level intra-lending are discussed herein. First and foremost, as collective group savings is the building block of the self-help group movement, we hypothesize it to have a favourable impact on intra-lending, such that an increase in group savings will lead to an increase in the group corpus and consequently, intra-lending would be positively affected. Next, it is hypothesized that the amount of money internally lent would be positively affected if members were to have equitable access to credit. This is because as more members take loans from the group corpus, the loan amount gets better spread and this speeds up the loan repayment cycle, thereby enabling greater intra-lending. In addition, internal loans accessed by all members build a greater sense of belonging to the group as members see the benefits of group membership getting equally shared among all. This further strengthens the commitment of members towards group activities, ensuring timely savings and repayments and reinforcing greater intra-lending. Cohesive groups in which members continue to stick together and remain united in pursuit of the groups' goals and objectives are hypothesized to experience greater intra-lending because members would be more aware of each other's needs and situations and consequently would be willing to extend loans to peers as and when required. Moreover, no change in group composition since inception would also help in effectively dealing with the moral hazard problem. Next, with an increase in the percentage of members using loans for income generation activities, intra-lending is expected to be favourably affected. This is because as a greater percentage of members use their loans for income generation activities, they would frequently resort to taking loans from the group corpus to support their enterprises, thereby increasing intra-lending amount. In the process of supporting micro-businesses, the entrepreneurial skills of members also improve and members may undertake additional entrepreneurial activities, which are likely to boost group level intra-lending.

Similarly, the practice of signing financial records is hypothesized to have a positive effect on intra-lending. This is because implementing such a practice enables the members to monitor the savings and loan repayment performance of other members in the group, thereby serving as a mild form of informal peer audit of the group's financial records. In addition, adherence to this practice is expected to bring in transparency to the group's functioning, which is key to building trust, and thereby

positively affect intra-lending. With respect to homogeneity, it is hypothesized that groups that are homogeneous regarding occupation and caste engage in greater intra-lending among themselves. This is because homogeneous groups ensure that members are better able to monitor how their peers use loans and consequently ensure repayments; regular repayments are crucial for the group to continue to engage in intra-lending. Finally, regarding the effect of the distance variable, it is hypothesized that the distance of a bank, if far, may act as a potential deterrent for the members to regularly deposit their savings contribution at the bank outlet. Consequently, savings would be kept with office bearers at their home, which could increase chances of misappropriation of funds and adversely affect the trust of members on group's functioning, possibly leading to decrease in intra-lending. Accordingly, the proximity to banks is expected to favourably affect intra-lending.

Potential determinants of frequency of bank credit and amount of bank credit

The set of factors affecting group sustainability with respect to access to external loans are discussed in this section.

It is hypothesized that groups in which members deposit savings contributions or loan installments on each other's behalf could access a greater number of bank loans and larger amounts. This practice not only ensures regularity of saving, but it also enables timely repayment of loan installments, which would positively affect the group's likelihood of accessing bank loans. Next, it is expected that frequency and the amount of bank credit accessed would be high for groups in which a greater number of members use the loans for income generation activities. This is because using loans for such activities hints at the entrepreneurial capabilities of group members and groups with more entrepreneurial members would access more loans (and of larger amounts) from banks. In fact, investing a bank loan in income generation activities is favoured by banks as they regard the likelihood of loan repayment to be high if loans are invested in such activities, as compared with using the loans for consumption purposes. The effect of an increase in savings contribution on the frequency and amount of bank credit accessed is studied by including two terms, growth in savings and growth in savings square. Accordingly, a two-pronged hypothesis is proposed. It is expected that with an increase in the per member savings contribution, the frequency and amount of credit accessed would be positively affected, as the group corpus would increase and it would be easier for group members to access more loans against their increased savings. However, if the degree of the increase in per member savings contribution is very high, it is then likely that the group's dependence on external loans would fall as members would be able to meet their credit needs from their internal group corpus.

Furthermore, it is postulated that groups that have undergone specific skill training (of their choice) are likely to access a greater number and amount of bank loans. This is because if the members themselves decide on the kind of microenterprise training they would like to receive, then their chances of starting a microenterprise would be high. Subsequently, the group is likely to access more bank loans to invest in or support their businesses. Next, it is hypothesized that with increasing distance from a bank, both the sustainability indicators – frequency and amount of bank credit – would be adversely affected. Finally, with a rising group size, it is hypothesized that the number and amount of bank loans would increase because of higher demand for borrowing.

IV. STUDY AREA, SAMPLE DATA AND ESTIMATION STRATEGY

Study area

For this study, a primary survey of self-help groups was carried out in Thane district of the state of Maharashtra, India over the period April-September, 2013. The survey was conducted in collaboration with Mahila Arthik Vikas Mahamandal, a nodal agency tasked with implementing women empowerment programmes in Maharashtra through self-help groups. While the concerned nodal agency has presence in all the districts of Maharashtra, based on discussions with nodal agency officials, we identified Thane district as the study area given that it had a good mix of self-help groups with different age groups. The questionnaire was administered to random sample of 170 all women self-help groups that had been functioning for at least three years. The threshold of three years is as per expert advice obtained from bankers and other stakeholders in the field of self-help group banking on the view that groups operating for less than three years have not necessarily achieved a level of stability with regard to adherence to set of processes and are also unlikely to have obtained repeat loans. After cleaning the data for missing entries, the sample size consisted of 155 self-help groups.

Sample data

A structured questionnaire was used to solicit data from self-help groups in the following areas: (a) group composition; (b) details on the mechanism of group formation; (c) performance of the groups on various financial, governance and institutional parameters; and (d) information on bank linkage of groups. Group interviews were held with office bearers (leaders, secretaries, treasurers), given their crucial role in the functioning of the group. The record books maintained by self-help groups, such as savings-cum-loan ledger, the meeting minutes book and their bank pass book, were personally examined. In general, group meetings were held on a monthly basis and the attendance was high. All the groups had an exclusive female membership and, on average, a group had 11.24 members. The groups, on average, had existed for six years

(ranging from 3.07 years to 15.96 years). Average years of education of the group leaders and secretaries was 7.55 years (ranging from no schooling to graduation) and 7.14 years (ranging from no schooling to post-graduation), respectively, while group members, on average, had been educated for 4.08 years. Approximately, 42 per cent of the members belonged to the Other Backward Castes, 31 per cent members were of the Scheduled Tribe and the remaining 27 per cent belonged to the Scheduled Caste. Agriculture was the primary occupation of approximately 73 per cent of the group members, and 20 per cent of them had migrated to find work or worked as labourers on agriculture farms of people from the same or other villages. Only 7 per cent of the members reported to be either working in a salaried job or as self-employed in small businesses.

A summary of the profile of the sample self-help groups on sustainability indicators and potential drivers of sustainability is presented in tables 1 and 2, respectively. In this study, the unit of analysis is a group, so the variables are studied at the group level, and not on a per capita basis.

Table 1. Profile of self-help groups on sustainability indicators

Sustainability indicators	Measured as	Mean	Range	Standard deviation
Intra-lending	Amount internally lent since inception (in Indian rupees)	109 386	(5 000-632 000)	6 592
Frequency of bank credit	Number of times bank loan accessed by the group since inception	1.63	(0-6)	0.93
Amount of bank credit	Cumulative amount of bank loan availed by the group since inception (in Indian rupees)	91 079	(0-332 000)	4 950

Source: Author's compilation.

Table 2. Profile of self-help groups on potential drivers of sustainability

Variables	Mean values
Group savings	
Cumulative amount of group savings (in Indian rupees)	50 695
Equitable access to credit	
Groups in which all members have accessed internal loans from group corpus	31%
Groups in which all members have not accessed internal loans from group corpus	69%
Group cohesion	
Groups in which all members continue since inception	60.65%
Groups in which members have dropped or added since inception	39.35%
Paying on each other's behalf	
Groups in which members pay savings or an installment on each other's behalf	74.84%
Groups in which members do not pay savings or a loan installment on each other's behalf	25.16%
Loan utilization for income generation activity	
Percentage of group members using loan for income generation activity averaged over number of loans taken	23%
Signing financial records	
Groups in which members have signed financial records over the past six months	81.94%
Groups in which members have not signed financial records over the past six months	18.06%
Growth in savings contribution	56.7%
Training for skill building	
Groups that have received skill-formation trainings (of their choice)	25%
Groups that have not received such trainings	75%
Homogeneity	
Non-homogeneous by occupation or caste	10.96%
Homogeneous by occupation or caste	30.24%
Homogeneous by occupation and caste	58.80%
Distance from bank	7.6 (km)
Group size	11.63

Source: Author's compilation.

Estimation strategy

The effect of the relevant set of factors (explanatory variables) on each of the sustainability indicators is discerned using regression analysis. To determine factors that influence intra-lending and the amount of bank loans accessed, an ordinary least square regression is done by taking the natural logarithm of the dependent variables. The log-linear regression model is estimated as the residuals that are closer to the normal probability curve in the case of logarithmic specification, as against the non-log form. All explanatory variables that are categorical in nature are used for the analysis by converting them to dummy variables and specifying a baseline/reference category; for n levels of a variable, n-1 dummies are needed. Frequency of bank credit – measured as number of times bank credit accessed (NCA) is a discrete variable, with values ranging from one to six (as shown in table 1), and there is a natural ordering to values of this variable. The data for NCA are rank ordered, namely NCA taking value six implies a greater number of bank loans as against value one. Accordingly, three ordered categories were created for the variable NCA. The categories correspond to accessing bank loans once, twice and three times or more. Subsequently, the ordinal logistic regression model is used to estimate the probability of being classified to specified ranks or levels. McCullagh (1980) introduced the ordinal logistic regression model for predicting ordinal variables (variables that are discrete in classification but ordered in values) as a function of some explanatory variables (x_1, x_2, ..., x_n). The cumulative logit model is the most widely implemented ordinal logistic regression model (Agresti, 2002). It is also known as the proportional odds model (McCullagh, 1980) in which the effect of predictor(s) is assumed to be the same for all categories of the dependent variable. The maximum likelihood estimation technique is used to estimate unknown parameters of this model. The ordinal logistic regression equation for NCA is given below:

$$\frac{Pr\ (NCA = r)}{Pr\ (NCA < r)} = e^{\alpha_2+.....+\alpha_r+\beta_1 x_1+\beta_2 x_2+.....+\beta_n x_n}$$

where, r = 3 corresponds to three ordered categories. The parameters (βs) in the cumulative logit model are interpreted as the natural logarithm of odds of being in a higher category, as opposed to being in any of the lower categories (Mennard, 2010).

V. RESULTS

The regression results for each of the sustainability indicators are separately discussed below. For intra-lending, the model was run across the 155 self-help groups, however for the other two indicators, the sample size was 143 (as 12 self-help groups had yet to access a bank loan).

Estimation results for intra-lending

To nullify the effect of age on intra-lending, the parameters are estimated for annual intra-lending. The model for annual intra-lending is significant as a whole (*F*-value = 21.95, *p*-value < 0.001) and explains the variance of dependent variable reasonably well (R^2 = 55%, adjusted R^2 = 52%). The estimation results for intra-lending are presented in table 3.

Table 3. Regression results for intra-lending

Explanatory variables	Description	Expected sign	Parameter estimates
Annual group savings	Annual savings of group	+	1.28 (11.08)***
Equitable access to credit	All members have not accessed internal loans (baseline)		----
	All members have accessed internal loans	+	0.34 (2.90)***
Group cohesion	Change in member composition since inception (baseline)		----
	No change in member composition since inception	+	0.03 (0.29)
Loan utilization in income generation activity	Percentage of members using loan for an income generation activity averaged over the number of loans taken	+	0.46 (2.66)***
Signing financial records	No (baseline)		----
	Yes	+	0.29 (1.77)*
Homogeneity	Homogeneous by occupation or caste (baseline)		----
	Non-homogeneous by occupation and caste	-	0.04 (0.18)
	Homogeneous by occupation and caste	+	0.07 (0.58)
Distance	Distance from bank (km)	-	-0.01 (-1.22)
Intercept			-2.46 (-2.22)**

Notes: t-ratios are in parenthesis. The superscripts *, **, *** imply 10%, 5% and 1% levels of significance, respectively.

Annual group savings have a significant positive effect on the amount of intra-lending among the group members, thereby supporting the proposed hypothesis. Similarly, equitable access to credit has a significant positive effect on intra-lending. An increase in the percentage of members using loans for income generation activities results in an increase in intra-lending. The regression coefficient for signing financial records is significant and positive, thereby supporting the hypothesis. Having a high level of homogeneity appears to have no significant effect on intra-lending, therefore the proposed hypothesis is not supported. Similarly, distance from a bank seems to have no effect on intra-lending.

Estimation results for the number of times bank credit accessed

For NCA, the ordinal logistic regression model is fitted to model the three ordered categories of NCA (once, twice and three times or more). The expected sign of effect of relevant explanatory variables and the regression results are presented in table 4. The regression results are interpreted as odds of improving NCA corresponding to improvement in explanatory variables.

Table 4. Results of the ordinal logistic model for number of times bank credit accessed

Explanatory variables	Description	Expected sign	Parameter estimates
Paying on each other's behalf	No (baseline) Yes	 +	---- 2.24 (9.35)***
Loan utilization in income generation activities	Percentage of members using loan for income generation activities averaged over number of loans taken	+	2.94 (18.89)***
Growth in savings contribution	Growth in savings contribution (Growth in savings contribution)^2	+ -	1.60 (4.95)*** -0.47 (0.63)***
Training for skill building	No (baseline) Yes	 +	---- 1.29 (3.63)***
Distance from bank	Distance from bank (km)	-	-0.12 (0.89)***
Group size	Number of members in group	+	0.19 (1.21)*
Intercept 1			-7.47 ***
Intercept 2			-3.93 ***
	-2LogL (intercept only)		280.88
	Intercept and covariate		200.47

Notes: Odd ratios are in parenthesis. The superscripts *, **, *** imply 10%, 5% and 1% levels of significance, respectively.

The practice of paying loan and savings installments on members' behalf has a positive effect on NCA, as the odds of improving NCA increase by 9.35 times when group members adhere to this practice. Similarly, with an increase in the percentage of members using the loan for an income generation activity, the odds of improving NCA increase by 18.89 times. In addition, the odds of improving NCA increase by 4.95 times with an increase in a savings contribution. With substantial increase in savings, however, the odds decline by 0.63 times, thereby supporting the proposed hypothesis (this phenomenon is discussed in detail in the next section "Estimation results for the amount of bank loans accessed").

The effect of trainings is as expected; the odds of improving NCA increase by 3.63 times if groups receive skill-development training (of their choice). The effect of group size on NCA is also as expected; the odds of improving NCA increase by 1.21 times with an increase in group size. There is a negative effect of increasing distance from a bank; the odds of improving NCA decline by 0.89 times as the distance from a bank increases.

Estimation results for the amount of bank loan accessed

The regression model is significant as a whole (*F*-value = 18.69, *p*-value < 0.001) and explains the variance of dependent variable reasonably well (R^2 = 49%, adjusted R^2 = 47%). The estimation results for amount of bank loan accessed are presented in table 5.

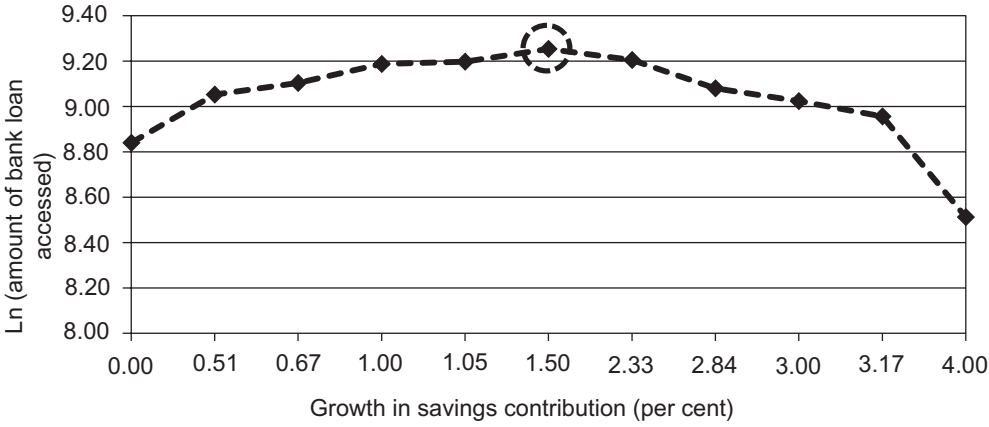
Table 5. Regression results for amount of bank loan accessed

Explanatory variables	Description	Expected sign	Parameter estimates
Paying on each other's behalf	No (baseline)		----
	Yes	+	0.54 (3.13)***
Loan utilization in income generation activity	Percentage of members using the loan for an income generation	+	2.07 (8.64)***
Growth in savings contribution	Growth in savings contribution	+	0.49 (2.29)**
	(Growth in savings contribution)^2	-	-0.14 (-2.09)**
Training for skill building	No (baseline)		----
	Yes	+	0.43 (2.45)**
Distance from bank	Distance from bank (km)	-	-0.02 (-1.58)
Group size	Number of members in group	+	0.10 (2.29)**
Intercept			8.84 (16.39) ***

Notes: t-ratios are in parenthesis. The superscripts *, **, *** imply 10%, 5% and 1% levels of significance, respectively.

Regarding the effect of members using a loan for income generation activities, it is observed that the regression coefficient for this variable is positive and significant, and therefore supports the hypothesis. The regression coefficient for depositing a savings contribution or loan installment on another member's behalf is also significant and positive, as expected. Regarding the effect of an increase in savings contribution, the two-pronged hypothesis is supported as the regression coefficient for growth in the savings contribution is positive and significant, while the coefficient for (growth in savings contribution)^2 is negative and significant. This non-linear relationship implies that an increase in savings has a positive effect until a turning point is reached and beyond that, the effect is negative. This effect is graphically shown in the figure in which it can be seen that beyond an increase in the savings contribution of 150 per cent, which is the threshold or turning point, the group's dependence on external bank loans declines.

Figure. Non-linear relationship between growth in savings and amount of bank loan accessed



As expected, groups that have received the required skill formation training are seen to access a greater amount of bank credit. Finally, while group size is seen to have a significant positive effect on the amount of the bank credit accessed, there is no significant effect of distance from a bank.

Model adequacy checking

For this study, the adequacy of each of the fitted models was also assessed. As part of the regression diagnostics to determine whether the ordinary least squares regression model adequately fits the data for intra-lending and the amount of bank loan accessed, residual plots are examined (Cohen and others, 2003). The residual plots

suggest that the fitted model is adequate as the residuals meet the assumptions of normality and homoscedasticity. The variance inflation factor values are below 10 for the explanatory variables used in each of the models, suggesting that there is no multicollinearity problem (Gujarati and Sangeetha, 2007). Similarly, for the ordinal logistic regression, three different test statistics, likelihood ratio, score and wald, are used to test the significance of the predictor/explanatory variables. These test statistics follow chi-square distribution and are a commonly used measure of model fit (Hosmer and Lemeshow, 2004). All three test statistics indicate good model performance. The model performance is also judged by the measure of association of predicted probabilities and observed responses, which is captured by area under the receiver operating characteristic curve (AUC values). For the response variable NCA, the AUC value is 0.86; Hosmer and Lemeshow (2004) suggest that AUC values greater than 0.8 indicate good model performance.

VI. DISCUSSION AND POLICY IMPLICATIONS

This section contains a summary of the main findings of the study and highlights of the implications of the findings for policy and practice. The main theme of this study is concerned with the topic of sustainability of bank-linked self-help groups in India, broadly defined in microfinance literature as repeating performance in the future (Shreiner, 1996). The meaning of sustainability, however, varies depending on who is using it and in the context in which it is being used (Bell and Morse, 2008). The contribution of this study is a conceptual framework for addressing the topic of sustainability of self-help groups, which fills a crucial research gap. The proposed manner of studying sustainability of self-help groups not only takes into account the group's financial performance with respect to specific outcomes or objectives, but also reflects on the means to achieve the said outcomes. Focusing on the means alongside outcomes is helpful in understanding the linkage between these two aspects and enables appreciation of the reasons for the observed outcomes. This approach to studying sustainability shows allegiance to the idea of Mahatma Gandhi on means and ends (Mantena, 2012), as Gandhi observed, "The clearest possible definition of the goal and its appreciation would fail to take us there if we do not know and utilize the means of achieving it. I have, therefore, concerned myself principally with the conservation of the means and their progressive use. I know that if we can take care of them, attainment of the goal is assured" (Gandhi, 1933, p. 393). An important policy implication arising from this conceptualization is that groups need to be made cognizant that if they are to perform well with respect to outcomes, in this case, the sustainability indicators, they need to focus on designing and implementing appropriate governance mechanisms around group management processes.

With regard to the choice of sustainability indicators, it is important to note that while access to credit is crucial for group sustenance, the policy framework for enabling financial inclusion through self-help groups should be designed in a way that gives consideration to the coexistence of formal and informal credit markets. This implies that policy-level planning for developing appropriate financial products needs to take into account the complex and dynamic nexus of internal and external credit mobilization practices of self-help groups (corresponding to intra-lending and bank loans, respectively), especially as the reasons for borrowings from formal and informal markets are primarily different (Mohielden and Wright, 2000). In addition, the findings from the regression analysis (section V) highlight the effect of different group management practices on each of the sustainability indicators. Of all the contributory factors, the factor "percentage of members using the loan for income generation activities" has a significant positive effect on the three sustainability indicators. Self-help group members using loans for income generation activities suggest that their individual financial needs have been met. It also indicates that having set up their microenterprises, the members are subsequently availing bank loans more frequently of larger amounts, while also mobilizing internal credit to augment the group's working capital to further expand their business, thereby having a significant positive effect on the sustainability indicators. The results indicate, however, that the percentage of members who had used their loans for income generation was low (merely 23 per cent, as reported in table 1). This is indicative of the bottlenecks typically faced by the group members in initiating microenterprises. Previous studies have documented the lack of adequate skills, infrastructure support and market linkages as the primary reasons preventing self-help groups from graduating from the stage of microfinance to the stage of microenterprises (Mahajan, 2005; Kashyap, 2008). This calls for policymakers to formulate and offer a specific handholding strategy that provides focused trainings to self-help group members on financial and non-financial aspects of running a business, including the basics of financial management, imparting knowledge of making a business plan, market, production expenses and raw material sourcing. In addition, there is a dire need for policy interventions and solutions that enable investment in infrastructure – physical, marketing and technological, to help self-help groups successfully set up and run their micro-entrepreneurship models.

With respect to the factors affecting intra-lending, the findings suggest that in addition to loan utilization in income generation activities, it is positively affected by group savings and members having equitable access to credit. Group savings is the building block of the self-help group movement. The "savings first and credit later" strategy of the Self Help Group-Bank Linkage Programme has made great progress in inculcating financial discipline among self-help group members. While a great effort must be made to inculcate the need for regular savings by group members, there is even greater need for using the power of information technology to keep a record of the pattern of savings of the group members. This not only ensures transparency in group

functioning, but it also enables the lenders to gauge the quality of the groups (on the savings aspect) before taking credit decisions. With regard to the second factor, it is important that self-help group promoting institutions and banks strongly focus on ensuring that benefits of group membership are equally shared among members. This is reflected in members having equitable access to credit. Nonetheless, ensuring implementation of this practice is easier said than done, given that monitoring intra-lending activity at such minute levels is labour- and time-intensive. As such, digitization of self-help group level transactional data is potentially a critical policy intervention (the digitization initiative is discussed in detail later).

With regard to factors that significantly affect the frequency and the amount of bank credit accessed, it is observed that there is a non-linear relationship between growth in savings contribution and group's dependence on external bank loans. The decline in frequency and amount of loan accessed (beyond a threshold point) can be explained by two possible reasons: (a) substantial increase in savings increases the group corpus and consequently group members prefer to rely on intra-lending instead of relying on external bank credit; and (b) as a result of participation in the Self Help Group-Bank Linkage Programme, the disposable income of group members has increased (as documented in studies by Mahila Abhivrudhhi Society, Andhara Pradesh, 2017; Rao, 2009; Swain and Varghese, 2009), and subsequently the dependence of group members on bank credit facilities through a self-help group scheme declines as the members opt to access individual bank loans (Karmakar, 2008; Reddy and Reddy, 2012). An important implication of this finding is that if required handholding or capacity-building were to be provided to such self-help groups with the objective to enable them to establish microenterprises, then bank lending to the groups could be revived. Similarly, the practice of group members extending savings or loan installments on each other's behalf has a significant positive effect on accessing external loans. While this practice is indicative of the discipline maintained by the group in ensuring regularity of savings and avoiding defaults on bank loans, the challenge is for lenders to have ready access to these data, which is only possible if the accounts of self-help groups are digitized so the lenders can attain reliable inputs required to take credit decisions.

In addition, making available specific skill training has a favourable effect on group sustainability, that is, such groups access a greater number and amount of bank loans. However, the fact that only 25 per cent of the groups reported receiving skill-building training of their choice (table 2) is worrisome and against the participatory spirit of the Self Help Group-Bank Linkage Programme. A relevant policy implication from this finding is that if the government, banks and promoting institutions are serious about enhancing the credit absorption capacity of groups, then due emphasis must be placed on the voice of self-help group members in deciding the type of training they need for setting up their microenterprises, rather than being imposed with skill-building trainings that are of

little relevance to them.[12] With suitable training being extended to the group, it is likely that the percentage of members using loans in income generation activities and groups undertaking collective microenterprises would also increase. Furthermore, while taking into consideration the interest and existing skill set of members is important before offering skill-building exercises, an objective analysis of the market demand is also critical for such an initiative to succeed. In this respect, the role of promoting institution is of paramount importance, as presently, a majority of self-help group promoting institutions are non-governmental organization, and most of them have little business acumen and lack the capability to make a business plan and establish market linkages for the group. In this regard, the National Bank for Agriculture and Rural Development could possibly take the lead in facilitating such trainings for self-help groups. Homogeneity in group composition did not seem to have any effect on the selected sustainability indicators of the self-help groups. While this may seem counterintuitive, it is important to note that each of the sustainability indicators is related to the financial objective of the Self Help Group-Bank Linkage Programme. If the sustainability indicators had been so selected that they spanned across alternate dimensions, such as temporal, social or institutional, perhaps the effect of the homogeneity factor could be discerned.

Finally, with regard to the effect of distance from a bank, this factor appears to affect the frequency of accessing bank credit. The reason behind this phenomenon can be attributed to the social and cultural norms, traditions and gender biases within communities that not only act as a barrier for women to travel long distances, but it also restricts the people with whom they can interact (Fletschner and Kenny, 2014). In this respect, it is important to reflect on the role of technological innovations in bolstering financial inclusion. Digital financial services, for instance, are offering a new way to reach the last-mile customer in a cost-effective and affordable manner. In the context of the Self Help Group-Bank Linkage Programme, realizing the game-changing potential of digital financial inclusion is dependent on two core activities: (a) digitization of self-help group-level data; and (b) facilitating group members' access to and usage of digital payments. Regarding the first activity, digitizing social and financial information of the self-help groups is the first step in making it easier for bankers to do business with the groups. Post digitization, banks can readily access the book of accounts of self-help groups, the credit history of group members (using Aadhar-linked identities of members), and information on group-level day-to-day activities of self-help banks. Subsequently, banks can use this information to draw insights regarding the loan repayment behaviour

[12] During the field work, multiple groups complained of being forced to enrol for trainings for the sake of it. On the contrary, while a majority of the groups in the sample were dependent on agriculture as their primary occupation and expressed interest to be trained on ways to improve their agricultural productivity, such trainings were not being offered. In this regard, it is important to reflect on the Kudumbashree programme of Kerala (India), which has successfully trained women on group farming initiatives (Agarwal, 2018).

of group members, gauge the quality of the self-help groups and take informed decisions on credit allocation. The digitization of group-level records is being carried out by the Government of India as part of the EShakti project, which was launched in 2015 (in two districts) and has been extended to more than 100 districts (as of 2018) under the aegis of the National Bank for Agriculture and Rural Development.

Access to digital payments – whether on mobile phones, cards or online – has a critical role to play in fast-tracking financial inclusion for millions of unbanked adults. Digital payments not only lower the cost of providing financial services to the poor, but they also increase the safety and convenience of using a range of financial services, such as savings, payments, remittances, and insurance products (Realini and Mehta, 2015). Among the various means of digital payments, use of mobile phone is considered to be the most effective way of advancing financial inclusion, given that nearly 80 per cent of adults in emerging economies own a mobile phone (Manyika and others, 2016). Initiatives, such as M-PESA in Kenya, Wizzit in South Africa, Smart Money and G-Cash in the Philippines, MicroEnsure in Asia and Africa, and Eko and FINO in India, have revolutionized mobile payments by offering solutions that have been built around the pain point of the customers, while leveraging on the existing technological resources of the community or the local market. In fact, these innovative companies have illustrated the transformative potential of using a technology-centric approach, applying design-thinking principles, and having a collaborative mindset to form partnerships across sectors, so as to enable access to and usage of digital payments in a convenient, reliable and affordable manner (Goswami, 2016; Realini and Mehta, 2015).

With regard to India, while mobile phone penetration has increased phenomenally from five million subscribers in 2001 to 1.16 billion subscribers in 2019 (in a population of about 1.3 billion), the usage of mobile payment services remains far from universal. In addition, despite the country's efforts to make mobile Internet more affordable, the gender gap remains a major challenge. For instance, women in India are 56 per cent less likely to use mobile Internet and 26 per cent less likely to own a mobile phone (Global System for Mobile Communications, 2019). Apart from low levels of financial literacy and digital literacy among self-help group women members, social norms also play a major role in restricting women's access to and usage of mobile services (Barboni and others, 2018). Accordingly, the success of the new wave of financial inclusion will be judged by its ability to close this striking gender gap. Towards this end, a new synergy among various stakeholders, banks, mobile companies, credit bureaus, non-governmental organization and government, which have traditionally operated in their own silos, and willingness to innovate in delivery of financial services to the base of the pyramid population are required.

VII. CONCLUSIONS

Similar to other microfinance programmes, the Self Help Group-Bank Linkage Programme of India has focused primarily on women, who are the most vulnerable among the financially excluded. The crux of the study is in developing a deeper understanding of what constitutes sustainability and its contributory factors. Sustainability of bank-linked self-help groups is viewed in terms of access to financial services (from internal and external sources) for the group and has been captured across three indicators of financial performance, intra-lending, frequency of bank credit and amount of bank credit availed by the group members. Subsequently, the effect of a set of contributory factors that reflect the manner of functioning or organizational aspects of self-help groups on each of the sustainability indicators has also been ascertained. The results of regression analysis suggest that equitable access to credit, group savings, growth in savings, loan utilization in income generation activities, making available suitable training and distance from a bank are significant contributors to group sustainability (at 1 per cent level of significance). Overall, the findings from this study may be considered as suggestive of best practices that would help self-help groups make progress towards the sustainability frontier.

There are few limitations in this study, which could be addressed as part of future research work. First, operationalizing sustainability of self-help groups with respect to different socioeconomic objectives, as against purely financial objectives, as has been done presently, could provide further insights. Moreover, given the lack of access to member level-data for this study (as the unit of analysis is the group), it has not been possible to ascertain the effect of initiating microenterprises on members' incomes and assets, which many studies consider as the true measure of success of self-help groups. Another limitation of this research is inability to survey self-help groups that are no longer functioning. Comparing closed and running groups across sustainability indicators and corresponding group management practices could give in-depth insight into the reasons for failure of some of the self-help groups. To conclude, the Indian experience with the Self Help Group-Bank Linkage Programme has demonstrated that small, cohesive and participatory groups of the poor (that is, the self-help groups) are indeed creditworthy and bankable entities and that the "savings first and credit later" strategy is a win-win move, with transaction costs reduced for the borrowers and banks. Through the sustainability of self-help groups, the vast multitude of financially excluded and marginalized women can access institutional credit on a sustainable basis.

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WOMEN'S EMPOWERMENT AMONG MARRIED WOMEN AGED 15 TO 49 IN MYANMAR

*Mya Thandar, Hlaing Hlaing Moe and Win Naing**

The present study entails an investigation of the empowerment of married women aged 15 to 49 in Myanmar from socioeconomic and demographic perspectives based on data from the *Myanmar Demographic and Health Survey 2015-16*. The dimensions of women's empowerment are categorized into two parts: women's control over their earnings, and women's participation in household decision-making (decisions on major household purchases, visits to family or relatives, their health care; and the well-being of their children). These two dimensions are combined to create an index of women's empowerment. A binary logistic regression is used, by means of odds ratios to assess the relationship between women's level of empowerment and their socioeconomic and demographic characteristics. Overall, the findings of the study show that a higher empowerment level is associated with women's employment, increased age, urban residence, a higher educational attainment, a higher wealth quintile, and a lower level of husband's education. In addition, women that have one child or up to four children are more likely to have a higher level of empowerment than women with no children. About three fourths of the women in the sample live in rural areas. Among those women, the ones with a higher level of empowerment are more educated, employed and have higher household income. Generating employment opportunities for women and educating women are important factors that can lead to an increase in women's income, and accordingly, help raise the levels of women's empowerment.

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I. INTRODUCTION

Women are an important part of the domestic and global workforce. Despite this, women continue to experience different forms of discrimination worldwide. Some women suffer violations of their human rights throughout their lives, and realizing their human rights has not always been a priority. To achieve equality between women and men, it is necessary to gain a comprehensive understanding of the ways in which women experience discrimination and are denied equality in order to develop appropriate strategies to eliminate such discrimination. The term "women's rights" encompasses many different areas, making it among the most difficult areas of law to define. Women's rights are most often associated with reproductive rights, domestic violence, and education and employment discrimination. Women's rights also include health care, housing, social security and public benefits, human rights, immigration, child custody, and international law. Accordingly, women's empowerment has become a subject of serious concern among scholars and policymakers in developed and developing countries. The United Nations 2030 Agenda for Sustainable Development includes as one of its goals the achievement of gender equality and the empowerment of all women and girls (Goal 5). Hence, there is a need to examine the empowerment status of women in marital unions.

Background

In Myanmar, among the total population of approximately 51 million, 27 million are female (52 per cent) according to the 2014 Population and Housing Census. Among the women, 58 per cent are married and 87 per cent are literate.

Based on the 2014 Census, 67 per cent of the population in the working age of 15 to 64 is employed, with males comprising a higher proportion of labour force participation than women. The employment to population ratio is also much higher for the male population, at 82 per cent, as compared to 48.4 per cent for female population.

In the 2014 Gender Inequality Index, Myanmar ranks eighty-fifth out of 187 countries. The Government has been striving to achieve women's empowerment and gender equality by collaborating with the United Nations, non-governmental organizations and international non-governmental organizations. It has been making concerted efforts to promote the status of women, as conveyed through the National Strategic Plan for the Advancement of Women (2013-2022) of the Ministry of Social Welfare, Relief and Resettlement. The Plan provides a strategic opportunity to integrate

gender equality and women's rights into the Government's reform agenda. It is based on the 12 areas of women's lives outlined in the 1995 Beijing Platform for Action and covers a range of sectors, government ministries and departments. Goals for gender equality and women's rights can be well embedded into the Government's reform agenda by implementing the Plan for the Advancement of Women and by ensuring that gender equality perspectives are woven into sector policies, plans, and programmes across government ministries (ADB and others, 2016).

With the encouragement of the Government, many women senior officers in the public sectors and entrepreneurs in the private sectors have emerged. In 2012-2013, the percentage of female executives in government ministries was 37.6 per cent, an increase of 39.4 per cent from the period 2010-2015. The share of women elected as members of Parliament has risen from 5.9 per cent over the period 2010-2015 to 14.5 per cent in 2016 at the Union Parliament. At the state and regional levels, the share of women elected as members of Parliament increased from 2.8 per cent over the period 2010-2015 to 12.5 per cent in 2016. Among 14 states and regions, there are two female prime ministers at the state and regional level of Myanmar. At the governance level, it appears that women in Myanmar are becoming more involved and their presence is increasingly being felt. Nevertheless, there are still areas where women's empowerment and equality need to be improved.

Women in developing countries take part in the production process in agriculture, as well as in the formal and informal sectors. Women take on responsibilities at home and outside of the home, but their domestic roles are often ignored and undervalued. Traditionally, married women in Myanmar are responsible for only childbearing and child-rearing and management of household chores, and are considered as the nurturer in the family. Aside from these roles, they are also an important source of labour for economic activities. Accordingly, women's empowerment among married women has become a vital role and one that can contribute significantly towards the development of the country.

Various efforts have been made to develop a comprehensive understanding of women's empowerment and gender equality from different points of view. As more evidence emerges on the link between gender equality and women's empowerment with regard to economic growth and sustainable development, the interest in understanding the indicators for women has grown. This present analysis adds to the growing literature, focusing specifically on women's empowerment among married women in Myanmar and influences of women's economic and social status on their participation in decision-making within the household.

Research questions

The objective of this study is to investigate the association of women's empowerment to economic, social and demographic status of married women aged 15

to 49 in Myanmar. To meet the research objective, the research questions posed for the study are the following:

(a) How are socioeconomic and demographic characteristics related to women's control over their earnings?

(b) How are socioeconomic and demographic characteristics related to women's participation in household decision-making?

(c) How are socioeconomic and demographic characteristics related to overall women's empowerment?

Conceptual framework

Women have been recognized as key agents of development. At the Fourth World Conference Women, held in Beijing from 4 to 15 September 1995, the concept of women's empowerment was introduced to the meeting participants, which included State actors and Governments. The signatories of the Beijing Declaration, an outcome of the Conference, pledged to advance women's empowerment worldwide.

Their mission statement states the following: "The Platform for Action is an agenda for women's empowerment. It aims at accelerating the implementation of the Nairobi Forward-looking Strategies for the Advancement of Women and at removing all the obstacles to women's active participation in all spheres of public and private life through a full and equal share in economic, social, cultural and political decision-making" (United Nations, 1996).

These fundamental notions of empowerment have been incorporated into the growing literature on the conceptualization of women's empowerment. Kabeer (1999) noted that women's empowerment represented "the expansion in women's capability to make strategic life choices in a context where this capacity was formerly denied to them." Malhotra, Schuler and Boender (2002) proposed determining the general development of empowerment at different levels and in six dimensions: economic, sociocultural, familial/interpersonal, psychological, legal, and political. They defined women's empowerment as "a process of women gaining more power or security". Krishna (2003) described women's empowerment as "increasing the capacity of individuals or groups to make effective development and life and to transform these choices into desired actions and outcomes". Parveen and Leonhauser (2004) identified women's empowerment as an essential precondition for the elimination of world poverty and upholding of human rights, in particular at the individual level, in that it helps build a base for social change.

The United Nations has defined women's empowerment as a process whereby women are able to organize themselves to increase their own self-reliance, to assert their independent right to make choices, and to control resources, which will

assist in challenging and eliminating their own subordination (Malhotra, Schuler and Boender, 2002). Women's empowerment is a process that is related to the power of an individual to redefine her possibilities and options and to have the ability to act upon them (Eyben, Kabeer and Cornwall, 2008). It is also related to the influence of an individual on the social and cultural norms, informal institutions, and formal institutions in society. Women can be empowered in many dimensions — socially, economically, politically, and legally.

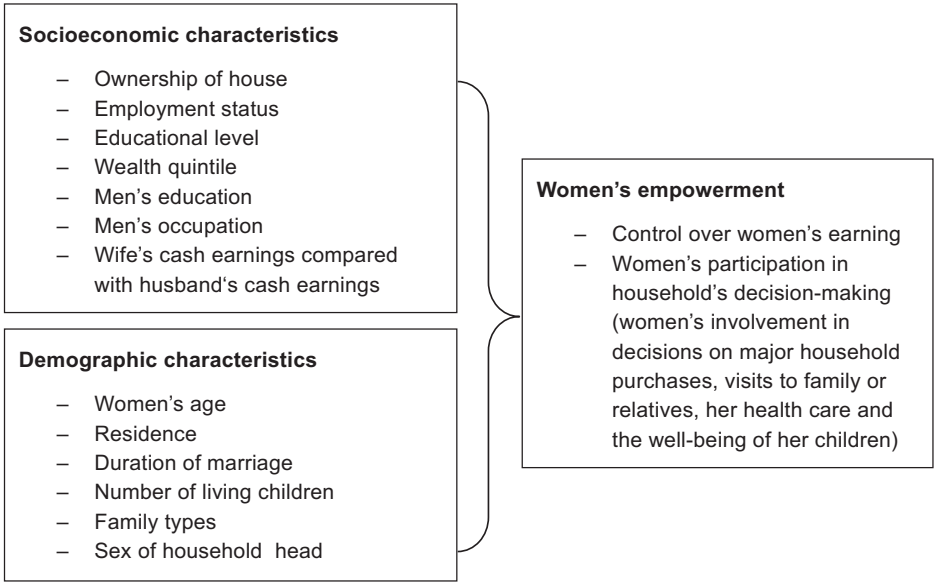
When defining women's empowerment, one of the similarities in the literature is the concept of women's decision-making power as an indicator of empowerment (Snijders, 2009). In the dimension of women's empowerment, gender equality and gender equity are terminologies that are interrelated. Equality implies the condition or quantity of being equal, and equality is the equality of rights. The concept of empowerment in gender and development often means working with women at the community level, building organizational skills. Wiklander (2010) stressed the importance of household-level statistics to investigate and reflect on the situation of all individuals within the household. Sharma and Shekhar (2015) also identified a positive relationship between women's empowerment and their socioeconomic and demographic characteristics. The authors observed that women's empowerment encompasses voice, mobility, decision-making power in the household, and freedom of choice.

A study conducted in Burkina Faso shows that women's decision-making is positively associated with cash employment, formal education and higher household wealth (Wayack Pambè, Gnoumou/Thiombiano and Kaboré, 2014). In the study, high levels of human capital and financial autonomy have been found to influence women's participation in decision-making. In acceptance of traditional gender roles, neither education nor financial autonomy is sufficient to assert lack of women's empowerment. Boateng and others (2014) indicated that among married women in Ghana, wealthier women were significantly more likely to be involved in decision-making on their own health care. In addition, age, tertiary education, and employment significantly shape their involvement in household decision-making. Surprisingly, married women in the Upper East region of Ghana (the second poorest) are significantly more likely relative to women in the greater Accra region (the capital) to be involved in household decision-making, except for decisions on large household purchases.

In studies conducted in Nepal, Acharya and others (2010) and Furuta and Salway (2006) reported that women's higher socioeconomic status, namely women's increasing education and participation in wage work, were positively related to women's greater decision-making in the household. In an analysis of women's empowerment in Monywa Township, Myanmar, Thida Htay (2016) found that women with a high level of income were most likely to have a high level of empowerment; media exposure showed a significant relationship with women's empowerment, whereas family structure and type of residence had no impact on empowerment.

As discussed above, various scholars and organizations have offered definitions of women's empowerment and have examined women's empowerment from different perspectives. To observe women's empowerment in this study, different dimensions of women's empowerment covering a wide range of attributes are considered and their relationship with socioeconomic and demographic characteristics is investigated. Figure 1 presents the conceptual framework of this study.

Figure 1. Conceptual framework



Source: Authors' own compilation (2018).

II. DATA AND METHODS

Data

To analyse women's empowerment, a wide variety of political, social, and economic determinants can be used, as empowerment is a multidimensional concept. Moreover, women's empowerment can be explored at the international, national, community, and household levels. The focus of this study is on women's empowerment at the national level in a household-based analysis in which only socioeconomic and demographic aspects are considered.

The newly available national *Myanmar Demographic and Health Survey 2015-16* is used to develop the analysis datasets. The survey is based on collected data for multiple indicators of demographic and health information (Myanmar, Ministry of Health and Sports and ICF, 2017). Approval was obtained from Myanmar's Ministry of Health and Sports and the DHS Program to use the data for this study.[1]

The data analysis of this study focuses only on married women aged 15 to 49. Although data on 12,885 women are available from the *Myanmar Demographic and Health Survey 2015-16*, this study was limited to 7,870 of them. To obtain nationally representative estimates, sampling weight is applied and the final weighted samples include 7,758 married women aged 15 to 49, except for the variable on control over women's cash earnings, where only 5,114 married women aged 15 to 49 who are working are considered.

Key variables and measurements

The identification and measurement of dependent and independent variables are considered for fitting six models in this study and is shown in table A.1 in the annex. For each of the independent variables, women are considered to exercise control over earnings or decision-making if they do so alone or jointly with their husband or partner.

Statistical analysis

For the multivariate analysis, a binary logistic regression model is used when the dependent variable is dichotomous, such as women's participation in decision-making. Using Stata version 15.1, data analysis is carried out in multiple phases. First, by means of binary logistic regression analysis, five different models (Models 1 to 5) are fitted for one item in the control over women's own earnings, and four items in the decision-making dimensions of women's empowerment — women's own decision on major household purchases, women's own decision on visits to family or relatives, women's own decision on health care, and women's own decision on the well-being of their children. The independent variables used are mentioned in the annex, table A.1. Second, an overall women's empowerment index is calculated based on these five different variables. The overall women's empowerment index of 0 to 3 and 4 to 5 are considered as low and high levels, respectively. Finally, the binary logistic regression model (Model 6) for overall women's empowerment level is carried out to determine the socioeconomic and demographic factors related to women's empowerment.

[1] The Myanmar Demographic and Health Survey data are publicly available free of charge from the DHS Program in the form of standard recoded data files, which are available at www.dhsprogram.com/Data/.

III. RESULTS

Descriptive analysis

In the annex, table A.2, information on demographic and socioeconomic characteristics of women included in the study is provided, along with descriptive statistics on their participation in household decision-making. By age, the group is divided almost equally between ages 20 to 25 and 35 to 49, with only 3 per cent aged 15 to 19. Approximately nine out of ten of them live in a household headed by a male. The vast majority of women, 74 per cent, live in rural areas, 47 per cent of them have a primary-level education, 64 per cent are currently employed, 41 per cent are in the poorest or poorer wealth quintiles, and 39 per cent have cash earnings that are less than their husband's.

Women's participation in decision-making

Concerning participation in decision-making, table A.2 in the annex shows the following: 92 per cent of the women participate in decisions on control over their own earnings; 91 per cent participate in decisions on the well-being of their children; 83 per cent participate in decisions on major household purchases; 82 per cent decide on visits to family or relatives; and 82 per cent make decisions on their own health care. Women with higher levels of education and women in urban areas are more likely to participate in all the types of decisions; this also applies to employed women and women in the wealthiest household quintile. The older the woman, the more likely she is to participate in these decisions. The same is true when the wife's cash earnings are more than the husband's or the same, but not for control over women's earnings. Women with no children are less likely to participate in all the types of household decisions. Female household heads are more likely to participate in household decisions apart from control over women's earnings and well-being of children.

Multivariate analysis

Model 1

A binary logistic regression model is performed on women's control over their own earnings, using the independent variables presented in table A.2 in the annex. The summary results are shown in the annex, table A.3. As table A.3 shows, employment status, education level, age, duration of marriage, and number of living children are statistically significant among employed women and have a positive association with women's control over own earnings. In contrast, men's education level is statistically significant and has a negative association with women's control over own earnings. Men with a skilled manual occupation and men working in agriculture are statistically significant variables, but in opposite directions. Compared with women whose husbands

work in unskilled manual labour, women whose husbands have a skilled manual occupation are more likely to have control over their own earnings, while women whose husbands have an agricultural occupation are less likely to control their own earnings, net of other factors. Moreover, the variable on wife's cash earnings compared with the husband's cash earnings is statistically significant. If women's cash earnings are less than their husband's, the women are less likely to control their own earnings than if their cash earnings are more than or the same as their husband's earnings, controlling for other factors.

Model 2

The results of the binary logistic regression analysis on women's decision on major household purchases using the same independent variables and the summary results are presented in table A.3 in the annex. They indicate that women's education level, age, duration of marriage, and number of living children are statistically significant and have a positive association with women's involvement in decisions on major household purchases. However, men's education level is statistically significant and has a negative association with women's decision on major household purchases. Men working in agriculture is a statistically significant variable and has a negative association with women's decision on major household purchases. Compared with women whose husbands work as unskilled manual labourers, women whose husbands have an agricultural occupation are less likely to be involved in decisions on major household purchases, net of other factors. Moreover, the variable on wife's cash earnings compared with husband's cash earnings is statistically significant. If women's cash earnings are less than their husband's, and if a husband does not bring in money and or the woman does not know the amount of her husband's or partner's income, the women are less likely to be involved in decisions on major household purchases than if their cash earnings are more than or the same as their husband's earnings, controlling for other factors.

Model 3

The results of the binary logistic regression analysis for women's decision on visits to family or relatives, using the same independent variables, are shown in the annex, table A.3. Women's employment status has a positive association and is statistically significant. Women's decision on visits to family or relatives is higher among employed women than unemployed women. Women's wealth quintile has a positive association and is significant. The higher the wealth quintile, the higher the women's decision-making power with regard to visits to family or relatives. The number of living children has a positive association and is statistically significant. Women's decision on visits to family or relatives among women with one or two children, and three or four children is higher than among women with no children. Men's education level has a negative association and is statistically significant. When their husbands have secondary and

higher levels of educational, women are less likely to make their own decisions on visits to family or relatives than when their husbands are uneducated.

Model 4

A binary logistic regression model is performed for women's decision-making about their own health care, using the same independent variables. The summary results are displayed in the annex, table A.3. Women's employment status has a positive association and is statistically significant. Women's decision-making about their own health care is higher among employed women compared with unemployed women. Women's high education level has a positive association and is statistically significant. Women's decision-making about their own health care is higher among women with more education compared with uneducated women, controlling for other factors. Women in the middle, richer, or richest wealth quintiles show a positive statistically significant association regarding control over own health care. The higher a woman's wealth quintile, the more likely she is to make decisions on her own health care. Residence has a positive and statistically significant association. Women's decision-making power on their own health care is greater among women living in urban areas than those living in rural areas. The number of living children has a positive association and is statistically significant. Women's decision-making about their own health care is higher among women with children than women with no children. However, men's education level has a statistically significant negative association. Women's decision-making about their own health care is lower when their husbands have a secondary or higher education compared with no education. Sex of household head is statistically significant. Women's decision-making over their own health care is higher for female household heads than when the household head is male.

Model 5

The results of a binary logistic regression analysis for women's decision-making on the well-being of their children, using the same independent variables, are shown in the annex, table A.3. Wealth quintile has a positive association and is statistically significant. The higher the wealth quintile, the greater the women's decision-making on the well-being of their children. The number of living children also has a positive association and is statistically significant. Women's own decision-making on the well-being of their children is higher for women who have children than for women who do not have children. Men's secondary education level is statistically significant. Women's decision-making on the well-being of their children when men have a secondary education is lower than when men are uneducated, controlling for other factors. Men's occupation is statistically significant. Women's decision-making on the well-being of their children is less likely when men's occupation is "others" — clerical, sales, household and domestic, and services — compared with unskilled manual labour, controlling for other factors. Women's cash earnings is also statistically significant. When a wife's cash earnings are

less than her husband's, her decision-making power on the well-being of her children is lower, which is also true when her husband or partner does not contribute money to the household (and for "don't know" responses), controlling for other factors.

In summary, the models show different significant variables. Among independent variables included in the conceptual framework, the number of living children is significant for all the types of women's decisions, while women's employment status is significant, except for the well-being of their children, and women's wealth quintile is significant apart from control over women's own earnings. Surprisingly, ownership of a house and family type do not have any association with women's empowerment in the models.

Model 6

An overall women's empowerment index is computed based on five variables: women's own control over their earnings; own decision on major household purchases; own decision on visits to family or relatives; own decision on their health care; and own decision on the well-being of their children. As already mentioned, a score of zero to three on the index is considered as a low level of women's empowerment, while a score of four to five is considered as a high level. According to this index, 82 per cent of married women aged 15 to 49 in Myanmar have a high level of women's empowerment as shown in the table below.

Table. Overall women's empowerment level

Overall women's empowerment level	Per cent
Low (0-3)	17.74
High (4-5)	82.26

Source: Myanmar Demographic and Health Survey 2015-16.

A binary logistic regression model is performed again to determine the overall women's empowerment level, using the same independent variables. A summary of results for significant independent variables is shown in the annex, table A.4. As the table shows, women's employment status has a positive association and is statistically significant at the 1 per cent level. The odds ratio indicates that employed women are 1.43 times more likely to have a high women's empowerment level compared with unemployed women, controlling for other factors.

Women's higher education level has a positive association and is statistically significant at the 5 per cent level. Women with higher education are 1.47 times more likely to have a high women's empowerment level than uneducated women, controlling for other factors. Women's wealth quintiles of richer or richest has a positive association

and is statistically significant at the 1 per cent level. Women in the richer or richest quintiles are 1.49 times more likely to have a high empowerment level compared with poor or poorer women, controlling for other factors.

Women's ages of 20 to 34 and 35 to 49 have positive associations and are statistically significant at the 5 per cent and 1 per cent levels, respectively. The odds ratios indicate that women ages 20 to 34 and 35 to49 are 1.85 and 2.16 times are more likely, respectively, to have a high empowerment level compared with women aged 15 to 19, controlling for other factors. Residence has a positive and statistically significant association, at the 10 per cent level. Urban women are 1.26 times more likely than rural women to have a high empowerment level, controlling for other factors.

The number of living children (one to two, and three to four) has a positive association and is statistically significant at the 1 per cent and 5 per cent levels, respectively. Compared with women with no children, women with one or two children are 1.72 times more likely to have a high empowerment level, and women with three or four children are 1.45 times more likely, controlling for other factors.

Men's education of secondary and higher levels are statistically significant at the 5 per cent and 1 per cent levels, respectively. Women whose husbands have an education at secondary and higher levels are 0.68 and 0.44 times less likely, respectively, to have a high empowerment level compared with women whose husbands are uneducated, controlling for other factors.

In the analysis, ownership of household and family type are not found to be associated with the overall level of women's empowerment, as measured by the index of five variables.

IV. DISCUSSION AND CONCLUSION

Women's empowerment is the right of women and a part of basic human rights which is one of the central concepts in the 2030 Agenda. There is widespread agreement that women must be empowered to play an effective part in national development. Women's empowerment is essential for sustainable development and economic growth of the country. It is evident that gender equality is important for economic growth, poverty reduction, and enhanced human well-being.

It is important that women's economic rights and empowerment, and gender equality are integral elements of mandates and operating procedures in the country. Policies and strategies should be focused on economic growth and on generating decent employment for women, and should entail the allocation of resources to the sectors in which poor women work, such as agriculture and the informal sector, less

developed regions and states where poor women live, and the factors of production they possess (low-skilled labour).

Women's lack of power over resources and decision-making has caught the attention of academicians and policymakers. It is essential to analyse the determinants of women's empowerment to inform policies for national development. Accordingly, in the study, the socioeconomic and demographic factors related to women's empowerment in Myanmar are explored.

The investigation of the relationship between women's empowerment and their socioeconomic and demographic characteristics reveal the following points:

- Women who are employed, educated, in a high wealth quintile, residing in an urban area, and whose husbands have a lower level of education have a higher level of participation in decision-making.
- Women with one or two children tend to have a higher level of empowerment than women without any children, while the level of empowerment for women with three or four children is slightly lower than that of women with one or two children.

Based on the findings of this study, key areas of policy priority are the following:

(a) Increasing the number of women in the workforce

(b) Increasing the number of female high-level officials and political representatives

(c) Reducing gender bias in the labour market

(d) Developing rural areas

(e) Continuing to remove gender differences in education.

By showing that high levels of education, employment status, wealth quintile, and residence significantly influence women's participation in decision-making, the analysis is consistent with previous studies on women's decision-making in other countries (Wayak Pambè, Gnoumou/Thiombiano and Kaboré, 2014; Boateng and others, 2014; Acharya and others, 2010). While this study raises many questions, it provides answers regarding the relationship between women's socioeconomic and demographic characteristics. It also supports the relationship of husband's education level and number of living children with women's empowerment. It is found that an increase in male education is associated with less women's empowerment. This may be because women in Myanmar are respectful of the traditional gender norms and give more respect to husbands who are more educated than their wives; consequently, women's participation in decision-making is lower. Moreover, the results of the study are consistent with the findings of a study by Thida Htay (2016), which focused on Monywa

Township, Myanmar, in terms of the significant impact on women's empowerment of household wealth, place of residence, and the lack of significance of family structure.

While this study enhances the understanding of women's empowerment in Myanmar, it has a number of limitations. It cannot show a causal relationship between the dependent and independent variables because the *Myanmar Demographic and Health Survey 2015-16* is a cross-sectional survey. In addition, even though the Myanmar Demographic and Health Survey response rate was high, missing data may affect the findings of the study. Though the ownership of land by women is considered an independent variable, multicollinearity is found. Accordingly, this variable is omitted in the data analysis. In this study, women's employment status is considered, but type of women's occupation is excluded; it should be considered in a further study. Because of data availability, only women's empowerment at the household level is highlighted and only socioeconomic and demographic characteristics are emphasized.

According to the Integrated Household Living Conditions Survey (2011), there is a substantial gap between the female and male labour force participation rates, at 54 per cent and 82 per cent, respectively, and underemployment is also more prevalent among females (at 41 per cent) compared to 35 per cent among males (Myanmar, Ministry of National Planning and Economic Development and others, 2011). Considering the gender parity in enrolment at the primary and secondary school levels and the larger proportion of women in higher education, the differences in the male-female labour participation rates and women's underemployment are concerns. The gap between women's education and employment calls for more rigorous exploration; it certainly points to the inadequate realization of women's rights and lack of optimization of women's potential for sustainable human development. It is, therefore, necessary to continue further analysis on gender dimensions in employment and education to gain a better understanding of this subject.

On average, although the ratio of women to men for hourly wages in industry has declined over time, it has been as high as 90 per cent. Gender segregation by industry and occupation and differences in human capital or productivity are arguably factors that lead to wage differentials (ADB and others, 2016). This points to the need for policies and programmes to reduce gender differences in the labour market. Accordingly, women's empowerment in the workplace should be investigated as a further study.

Lower enrolment rates of young men in higher education may also reflect the fact that they are more likely to find employment at an earlier age than young women and that young women are more likely to pursue a career (for example, as a teacher, which is a much admired and respected job in Myanmar) and hence should continue their studies at higher education institutions. Cultural traditions have also been identified as influencing this trend. The low salaries of teachers likely make these professions less appealing to men, who may be under social pressure to be the main breadwinner and

can obtain higher income in other sectors of the economy, often without a higher education. Myanmar women dominate the unprotected informal sector; they continue to bear the major responsibility for unpaid care work, especially in rural areas, in addition to their paid jobs, while men are typically the household heads (ADB and others, 2016).

Accordingly, an analysis is needed from the point of view of traditional cultural norms, spousal relationships and community gender attitudes, as religion and cultural experiences play vital roles in shaping women's empowerment in some countries. Moreover, reducing violence against women is also important in empowering women. Hence, in further research, it is necessary to study women's empowerment from the perspective of experiencing domestic violence. In addition, a significant aspect, the psychological dimension, should be considered as a further study.

Despite these limitations, this study has important implications. The major determinants for women's empowerment are employment status, age, residence, education level, wealth quintile, husband's education, and number of living children. On the whole, the findings confirm the major role that these factors play in women's empowerment in terms of participation in household decision-making. It demonstrates the importance of gender equality in higher education and employment opportunities. The national policies for rural development and programmes aimed at improving women's status in Myanmar should strive for gender equality and to empower them.

ANNEX

Table A.1. Identification of dependent and independent variables

Dependent variables	Independent variables
Model 1 Control over women's earnings Y = 1 if women alone and women and husband/partner = 0 if husband/partner alone, someone else and others	Ownership of the house X_1 = 1 if woman does not own the house = 2 if woman alone, woman jointly owns and woman alone and jointly owns Women's employment status X_2 = 1 if woman is currently unemployed = 2 if woman is currently employed
Model 2 Women's own decision on major household purchase Y = 1 if women alone and women and husband/partner = 0 if husband/partner alone, someone else and others	Women's educational level X_3 = 1 if no education = 2 if primary = 3 if secondary = 4 if higher
Model 3 Women's own decision on visits to family or relatives Y = 1 if women alone and women and husband/partner = 0 if husband/partner alone, someone else and others	Wealth quintile X_4 = 1 if poorer and poor = 2 if middle = 3 if richer and richest Women's age X_5 = 1 if 15-19 years = 2 if 20-34 years = 3 if 35-49 years
Model 4 Women's own decision on health care Y = 1 if women alone and women and husband/partner = 0 if husband/partner alone, someone else and others	Duration of marriage X_6 = 1 if 0-9 years = 2 if 10-19 years = 3 if 20-29 years = 4 if 30 years and above

Table A.1. *(continued)*

Dependent variables	Independent variables
Model 5 Women's own decision on well-being of children Y = 1 if women alone and women and husband/partner = 0 if husband/partner alone, someone else and others Model 6 Overall women empowerment Y = 1 if high level of empowerment indices = 0 if low level of empowerment indices	Residence X_7 = 1 if rural = 2 if urban No. of living children X_8 = 1 if no children = 2 if 1 and 2 children = 3 if 3 and 4 children = 4 if 5 children and above Men's educational level X_9 = 1 if no education = 2 if primary = 3 if secondary = 4 if higher Men's occupation X_{10} = 1 if unskilled manual = 2 if skilled manual = 3 if professional/technical/managerial = 4 if agricultural (self-employed and employee) = 5 if others Wife's cash earnings compared with husband's cash earnings X_{11} = 1 if more than him or same with him = 2 if less than him = 3 if husband/partner doesn't bring in money and don't know the earnings Family type X_{12} = 1 if nuclear family = 2 if extended family Sex of household head X_{13} = 1 if male = 2 if female

Source: Myanmar Demographic and Health Survey 2015-16.

Table A.2. Per cent distribution of women participation in the decision-making by socioeconomic and demographic characteristics

Characteristic	Per cent	Woman's participation decision making					
		Control over women earning	Major household purchase	Visit to family or relatives	Own health care	Well-being of children	Number of women
Ownership of house							
Woman does not own	33.4	91.1	83.2	81.9	83.2	88.9	2 593
Woman alone and woman jointly owns	66.6	92.1	83.6	82.7	83.6	92.6	5 165
Woman's employment							
Unemployed	36.4	88.5	82.0	80.6	82.0	90.3	2 821
Employed	63.6	92.2	84.3	83.4	84.3	92.0	4 937
Women education							
No education	15.4	90.1	81.1	80.4	81.1	89.5	1 193
Primary	47.1	91.1	82.6	82.2	82.6	91.7	3 656
Secondary	29.5	92.7	84.1	82.6	84.1	91.5	2 285
Higher	8.0	96.5	90.5	87.3	90.5	92.6	621
Women age							
15-19 years	2.9	78.1	70.4	74.8	70.4	74.1	227
20-34 years	46.4	90.5	83.0	81.6	83.0	90.5	3 597
35-49 years	50.7	93.7	84.6	83.6	84.6	93.1	3 934
Wealth quintile							
Poorest and poorer	41.3	90.2	79.9	79.1	79.9	89.6	3 207
Middle	20.1	91.5	84.9	83.4	84.9	92.3	1 555
Richer and richest	38.6	93.8	86.5	85.4	86.5	92.8	2 996

Table A.2. *(continued)*

Characteristic	Per cent	Woman's participation decision making					
		Control over women earning	Major household purchase	Visit to family or relatives	Own health care	Well-being of children	Number of women
Duration of marriage							
0-9 years	37.7	89.2	81.7	80.9	81.8	87.9	2 928
10-19 years	35.2	93.5	84.1	82.6	84.1	93.3	2 729
20-29 years	23.9	92.7	85.1	84.3	85.1	93.6	1 858
30 years and above	3.2	95.0	83.6	83.3	83.6	93.4	243
Residence							
Rural	73.9	91.2	81.8	80.9	81.8	91.0	5 736
Urban	26.1	93.7	88.1	86.5	88.1	92.3	2 022
Living children							
No children	11.8	87.2	74.4	74.2	74.4	75.0	916
One child or two children	52.3	92.4	85.4	84.3	85.4	93.7	4 061
Three or four children	27.1	92.6	84.3	82.9	84.3	94.2	2 098
Five children and above	8.8	92.1	81.1	80.3	81.1	90.6	683
Men's education							
No education	16.1	93.2	83.0	81.7	83.0	90.1	1 248
Primary	40.0	91.5	83.2	82.5	83.2	92.4	3 103
Secondary	37.6	91.0	83.3	82.4	83.3	90.6	2 915
Higher	6.3	94.5	86.5	84.1	86.5	92.7	490
Men's occupation							
Unskilled manual	36.8	91.6	81.5	80.9	81.5	91.3	2 853
Skilled manual	19.4	94.5	84.8	83.5	84.8	92.5	1 508
Professional/technical/ managerial	7.4	95.5	88.0	85.7	87.9	90.2	573
Agricultural	25.5	89.2	82.4	81.0	82.5	91.0	1 980
Others	9.6	91.1	87.3	87.0	87.4	91.4	745

Table A.2. *(continued)*

Characteristic	Per cent	Woman's participation decision making					
		Control over women earning	Major household purchase	Visit to family or relatives	Own health care	Well-being of children	Number of women
Wife's cash earnings compared with husband's cash earning							
More than his or same as his	26.2	91.5	85.4	85.0	85.4	93.9	2 033
Less than his	38.7	92.1	83.1	81.8	83.1	90.6	3 003
Husband or partner doesn't bring in money and don't know husband's or partner's earnings	1.0	86.1	87.3	88.2	87.3	88.6	79
Family type							
Nuclear family	53.1	92.3	83.9	82.8	83.9	91.6	4 119
Extended family	42.0	91.1	83.1	82.1	83.1	91.2	3 260
Sex of household							
Male	87.1	91.9	83.2	82.1	83.2	91.7	6 759
Female	12.9	91.6	85.1	84.3	85.1	89.4	999
Total	100	91.8	83.4	82.4	83.4	91.3	7 758

Source: Myanmar Demographic and Health Survey 2015-16.

Table A.3. Summary results of women's empowerment

Independent variable	Model 1	Model 2	Model 3	Model 4	Model 5
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Constant	2.61** (1.28-5.6)	1.78 (1.02-3.13)	2.27** (1.19-4.30)	1.66 (0.86-3.23)	2.11** (1.00-4.66)
Woman's employment					
Unemployed	1		1	1	
Employed	1.42** (0.94-2.14)		1.35** (1.03-1.76)	1.38** (1.06-1.81)	
Woman's education level					
No education	1	1		1	
Primary	1.39** (1.01-1.92)	1.33** (1.03-1.73)			
Secondary	2.10*** (1.37-3.22)	1.54*** (1.15-2.07)			
Higher	3.95** *(1.67-9.34)			1.76** (0.99-3.12)	
Wealth quintile					
Poorer and poor			1	1	1
Middle			1.36** (1.05-1.77)	1.45*** (1.11-1.88)	1.51** (1.07-2.13)
Richer and higher			1.50*** (1.14-1.98)	1.52** (1.15-2.00)	1.57** (1.10-2.25)
Woman's age					
15-19 years	1	1			
20-34 years	1.66* (0.95-2.90)	1.79** (1.14-2.81)			
35-49 years	2.61*** (1.32-5.15)	2.15*** (1.34-3.45)			
Duration of marriage					
0-9 years	1	1			
10-19 years	1.52 ** (1.04-2.25)	1.24* (0.97-1.57)			
20-29 years					
30 years and above					
Residence					
Rural				1	
Urban				1.35**(0.99-1.84)	

Table A.3. *(continued)*

Independent variable	Model 1	Model 2	Model 3	Model 4	Model 5
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Number of living children					
No children	1	1	1	1	1
One child or two children	1.38* (0.97-1.96)	1.34*** (1.04-1.72)	1.55** (1.18-2.06)	1.86*** (1.42-2.44)	5.11*** (3.57-7.30)
Three and four children			1.36* (0.95-1.95)	1.67*** (1.18-2.35)	6.00*** (3.73-9.64)
Five children and above				1.66** (1.02-2.69)	3.09*** (1.65-5.77)
Men's education level					
No education	1	1	1	1	1
Primary	0.64** (0.43-0.95)	0.68*** (0.52-0.88)			
Secondary	0.48*** (0.31-0.73)	0.52*** (0.40-0.69)	0.73* (0.53-1.02)	0.64*** (0.46-0.89)	0.66* (0.42-1.02)
Higher	0.44** (0.20-0.99)	0.67* (0.41-1.08)	0.44*** (0.25-0.77)	0.40*** (0.23-0.69)	
Men's occupation					
Unskilled manual					
Skilled manual	1	1			1
Professional/ technical/managerial	1.46 *(0.96-2.22)	0.74*** (0.60-0.93)			
Agricultural (self-employed)	0.72** (0.52-1.00)				0.57** (0.35-0.93)
Others					
Wife's cash earnings compared with husband's cash earning					
More than his or same as his	1	1			1
Less than his	0.38*** (0.18-0.79)	0.62*** (0.51-0.76)			0.62*** (0.48-0.81)
Husband or partner doesn't bring in money and doesn't know husbands' or partners' earnings		0.44** (0.21-0.92)			0.30*** (0.14-0.68)
Sex of household head					
Male		1		1	
Female		1.30* (0.96-1.77)		1.30* (0.96-1.77)	

Source: *Myanmar Demographic and Health Survey 2015-16*.

NNotes: ***, **, *: 1 per cent, 5 per cent, and 10 per cent level of significance, respectively. OR: odds ratio, CI: confidence interval. Only covariates with a significant association are shown. Results are adjusted for ownership of house, women's employment, women's education, wealth quintile, men's education, men's occupation, wife's cash earnings compared to husband's, women's age, residence, duration of marriage, number of living children, family type, and sex of household head.

Table A.4. Summary results of overall women's empowerment level

Independent variables		Odds ratio	95% confidence interval	
			Lower	Upper
Constant		0.88	0.48	1.59
Woman's employment	Unemployed (ref)			
	Employed	1.43***	1.12	1.84
Woman's education level	No education (ref)			
	Higher	1.47**	0.89	2.43
Wealth quintile	Poor (ref)			
	Richer or richest	1.49***	1.15	1.93
Woman's age group	15-19 years (ref)			
	20-34 years	1.85**	1.11	3.07
	35-49 years	2.16***	1.24	3.75
Residence	Rural (ref)			
	Urban	1.26*	0.95	1.66
Living children	No children (ref)			
	1-2 children	1.72***	1.34	2.22
	3-4 children	1.45***	1.04	2.02
Men's education	No education (ref)			
	Middle	0.68**	0.5	0.93
	Higher	0.44***	0.27	0.79

Source: *Myanmar Demographic and Health Survey 2015-16*.

Notes: ***, **, *: 1 per cent, 5 per cent, and 10 per cent level of significance, respectively. Only covariates with a significant association are shown. Results are adjusted for ownership of house, women's employment, women's education, wealth quintile, men's education, men's occupation, wife's cash earnings compared to husband's, women's age, residence, duration of marriage, number of living children, family type, and sex of household head. Overall, women's empowerment is based on an additive index composed of five items: control over earnings; decision-making on major household purchases; visits to family or relatives; own health care; and children's well-being; and is separated into high empowerment (4-5 items) and low empowerment (0-3 items).

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CHALLENGES IN IMPLEMENTING DECENTRALIZATION OF FOREIGN DIRECT INVESTMENT MANAGEMENT IN VIET NAM – CASE STUDY OF THE HUNG NGHIEP FORMOSA HA TINH STEEL PROJECT IN HA TINH PROVINCE

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Over the past decades, an increasing number of developing countries in Asia have experimented with decentralization in varying degrees to achieve good governance and promote democracy. In Viet Nam, even though decentralization has been limited to de-concentration (or administrative decentralization), foreign direct investment (FDI) management is vigorously decentralized at the provincial level and has proven to be problematic. In one instance, it led to an environmental disaster in 2016. The objective of the present paper is to explore the factors resulting in ineffective decentralization of FDI management in Viet Nam, focusing on the challenges that the local government has been dealing with under the decentralization set-up, in particular with respect to environmental protection. Drawing on the case study of the Hung Nghiep Formosa Ha Tinh Steel project in Ha Tinh province, it is argued that Viet Nam continues to lack the essential prerequisites for effective decentralization. It is the time for Viet Nam to reconsider the policy of decentralization in the area of FDI management. Bearing in mind that economic development is vital, it should go hand in hand with environment protection in order to ensure the country's sustainable development.

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Keywords: decentralization, foreign direct investment management, Hung Nghiep Formosa Ha Tinh Steel project, environmental protection, sustainable development

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I. INTRODUCTION

Since the early 1990s, Viet Nam has taken steps towards administrative decentralization to make State management more efficient and to promote democracy at the local level. Foreign direct investment (FDI) management is one of the most strongly decentralized sectors. However, the decentralization of FDI management has not been implemented smoothly. Decentralization initially led to a "race to the bottom" among provinces to attract foreign investment (Vu, Le and Vo, 2007). Many low-quality projects were approved, including projects with high environmental risks. Notably, environmental disasters in four central coastal provinces in 2016, caused by the Hung Nghiep Formosa Ha Tinh Steel project, raised the alarm about the management of FDI in the context of decentralization from the perspective of environmental protection. This also resulted in an intense debate over the authority and responsibility of central and local governments in approving and overseeing the project as they blamed each other for the disaster.

Theoretically, decentralization is a sound idea, but it can be very challenging in practice and even result in negative impacts if it is not properly implemented. As seen under the decentralization set-up, an unprecedented environmental disaster occurred because of a FDI project in Viet Nam. The following question has been raised: What is wrong with the decentralization of FDI management in Viet Nam, or more directly: Why did this FDI project result in major environmental damage? By answering this question, the intention of this paper is to explore the reasons behind the ineffective decentralization of FDI management in Viet Nam, thereby providing some policy implications for effective decentralized FDI management for the sustainable development of the country.

The author uses the Hung Nghiep Formosa Ha Tinh Steel project in Ha Tinh province as an illustrative case study. This is because the case is notable in that it rang a warning bell on the management effectiveness of FDI under decentralization in Viet Nam, focusing on the approval and supervision of the project, in particular with respect to environmental management. The first part of the paper is comprised of an analysis of relevant documents to establish the background of the case study. A detailed description of the disaster resulting from the project is then presented along with debates on the effectiveness of decentralization in FDI management.

In addition, semi-structured interviews were conducted in Ha Tinh province in August 2018 to collect primary data for the case study. The interviews were designed to achieve in-depth information about difficulties or challenges in the decentralized management of FDI from local perspectives. Three interviews were conducted with four provincial officials, including an official from the Department of Natural Resources and Environment, officials from the Department of Planning and Investment, and an official from the Investment Promotion Center. The interviews took place at the head office of the Investment Promotion Center under the People's Committee of Ha Tinh province.

Each interview lasted approximately one hour and was recorded by mobile phone. The interviews focused on the management of FDI in Ha Tinh province, including the role of FDI projects, difficulties faced by the local government in managing FDI under the decentralization strategy, and the controversy over the Hung Nghiep Formosa Ha Tinh Steel project incident, which took place in 2016. Based on an analysis of the case study, the challenges in the practice of decentralization in FDI management in Viet Nam is clarified in this paper.

II. POLICY OF DECENTRALIZATION IN FOREIGN DIRECT MANAGEMENT IN VIET NAM

In the development process, in addition to internal resources, countries rely on external resources, which consist of private capital flows (FDI), foreign portfolio investments and other financial flows, such as official development assistance (ODA) and international remittances. Among these external resources, FDI has remained a key source of finance and one of the least volatile flows to developing economies (UNCTAD, 2018, p. 12). As defined by the Organization for Economic Cooperation and Development (OECD), FDI is an investment by an individual or multinational enterprise of one country that establishes a lasting interest in and control over an enterprise in another country (cited in GreenInvest, 2017, p. 7).

In developing countries, FDI has been considered an important source of private external finance, which accelerates growth and economic transformation. This type of investment not only contributes to the resources available and capital formation but it also results in the transfer of technology, skills, innovative capacity and organizational and managerial practices, and provides access to international marketing networks (OECD, 2002, p. 5). Because of its potential benefits to economic growth and poverty alleviation, developing and newly industrializing countries are very eager to attract FDI. Over the past decades, governments of developing countries have embarked on policy reforms that are more open to foreign investment with the objective to draw capital inflows. They have liberalized national policies to establish a favourable regulatory framework for FDI by relaxing rules pertaining to market entry and foreign ownership and have offered preferential treatment to foreign investors (Mallampally and Sauvant, 1999).

Similar to many other developing countries, attracting FDI is a key policy of Viet Nam in the post-renovation period. As a result of a serious crisis in the 1980s, the Communist Party of Viet Nam has put forward a comprehensive reform of the country, including a policy to attract foreign investment to develop the economy. The Law on Foreign Investment 1987 is the most important legal document formalizing the policy to receive FDI in Viet Nam. The country started to welcome FDI in 1988. Notably, from

1988 to April 1989, the Ministry of Foreign Trade[1] issued investment licences for FDI projects. In May 1989, the State Committee for Cooperation and Investment was established to deal with the function of State management of FDI. The licensing authority for foreign investment projects was therefore transferred to the State Committee for Cooperation and Investment.

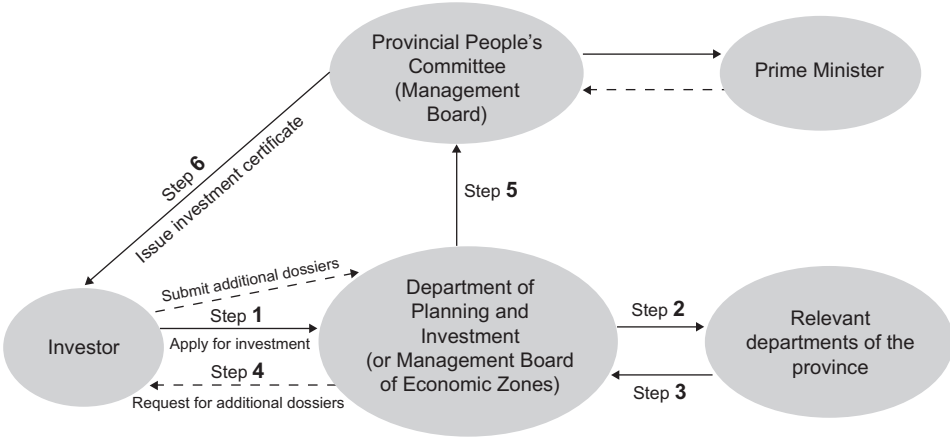
The effort to decentralize FDI management in Viet Nam started in the 1990s, in line with the increased flow of FDI into the country during the post-renovation period. In particular, after the normalization of diplomatic relations with the United States of America and an embargo was removed in 1995, the number of foreign projects invested in Viet Nam increased rapidly, burdening the central Government with managing all the projects. During that time, the Government of Viet Nam acknowledged that decentralization was necessary to avoid overloading in the central agencies. Provinces that received large amounts of FDI tried to convince the central Government to decentralize the licensing of FDI projects. This was based on the view that decentralization could reduce the excessive concentration of power in a single management agency, which easily leads to a greater bureaucracy and authoritarianism and also reduces the dynamism and degree of autonomy of local authorities. In addition, decentralization would help to ease the complicated procedures associated with FDI projects, which, in turn, would result in favourable conditions to attract foreign investors. In summary, decentralization was raised as part of a State reform that could spur creativity in the local government and increase its participation in the process to deal with FDI and improve the efficiency of State management in all areas. In this context, decentralization of investment management became an important part in the trend to decentralize governance and was later was recognized as an important area for decentralization in the country.

Following the merger of the State Committee for Cooperation and Investment and the State Committee for Planning into the Ministry of Planning and Investment in 1995, the decentralization of FDI management was gradually implemented. From 1996 to 2005, the Government granted provincial governments the power to appraise and license FDI projects, limited by the capital size and area of investment. Except for strategically important areas, such as petroleum, insurance, banking and auditing, the People's Committee of Ha Noi and Ho Chi Minh City were authorized to license projects with registered capital of up to US$10 million. Other provinces could license projects up to $5 million. The management board of the provincial economic zones, industrial zones, export processing zones and hi-tech parks were allowed to license projects with a registered capital of up to $30 million.

[1] The Ministry of Foreign Trade was closed in 1990 following the restructuring of the government structure.

In 2005, in line with the enactment of the new Investment Law, the management of FDI was almost completely decentralized to the provincial level. In the following year, the limit on investment size was removed, but the limit on investment area still applied. To be specific, except for a number of specialized projects, which are classified as conditional investment areas, provincial people's committees and management boards of economic zones have the authority to license all FDI projects, irrespective of the capital size. For projects deemed as being of national importance, approval from the prime minister in consultation with relevant ministries is required. In essence, decentralization in FDI management in Viet Nam has given the provincial governments almost full autonomy in granting FDI licences. The key agency dealing with FDI management at the provincial level is the People's Committee, which is assisted by the Department of Planning and Investment, and the management board of economic zones. The Department of Planning and Investment manages projects outside the economic zones and the management board of economic zones manages projects located within the economic zones. The interactions among agencies during the process to attain project approval are illustrated in figure 1.

Figure 1. Interactions among agencies during procedures for approval of the project



Source: X.H. (2016).

III. OVERVIEW OF THE HUNG NGHIEP FORMOSA HA TINH STEEL PROJECT IN THE VUNG ANG ECONOMIC ZONE IN HA TINH PROVINCE

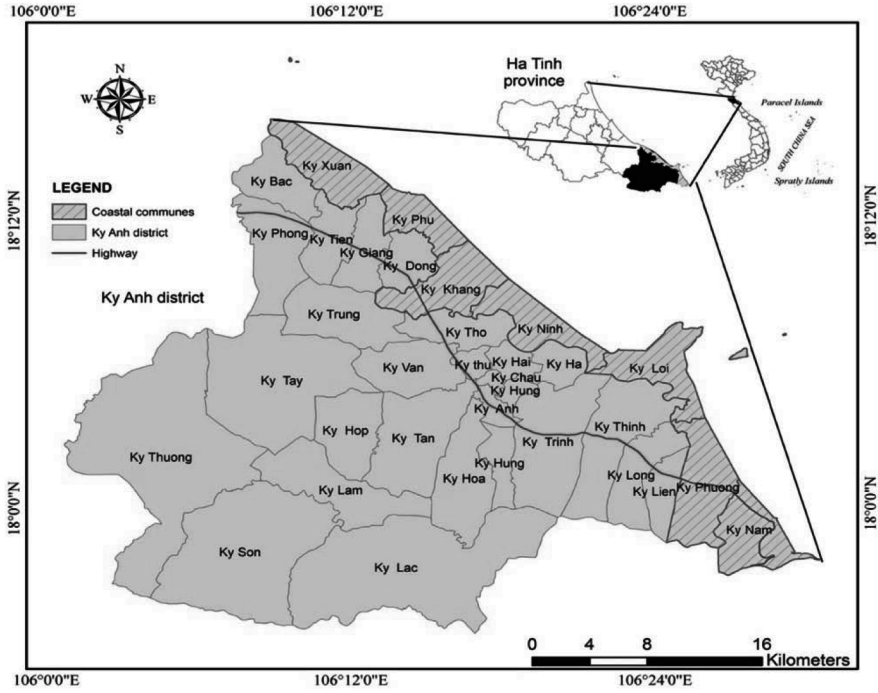
The establishment of the Vung Ang economic zone is an important milestone in the development process of Ha Tinh province. Located in the North Central coast, one of the least developed regions of Viet Nam, Ha Tinh is an impoverished province whose economy is mainly based on agriculture. Among the 63 provinces of Viet Nam, Ha Tinh accounts for only 1.1 per cent of the national gross domestic product (GDP), as described in the Ha Tinh socioeconomic master plan to 2020 and vision to 2050.[2] The plan to establish the Vung Ang economic zone is a major effort to boost the socioeconomic development of Ha Tinh in particular and the northern central region in general. The objective of the plan is to narrow the development gap with other regions of the country. Because of the impoverished conditions in Ha Tinh province, the prime minister approved a plan in 2006 for the construction of the Vung Ang economic zone and a deep sea water port linked to the economic zone in Ha Tinh province.

The Vung Ang economic zone is in the coastal district of Ky Anh in Ha Tinh. With a land area of 22,781 hectares, it covers nine communes of the Ky Anh district: Ky Nam, Ky Phuong, Ky Loi, Ky Long, Ky Lien, Ky Thinh, Ky Trinh, Ky Ha and Ky Ninh (figure 2). It is a multipurpose economic zone of various sectors, including industries, trade, services, tourism, urban centres, agriculture, forestry and fisheries, in which the development of the metallurgy industry, industries related to seaports, labour-intensive industries and export-processing industries are promoted.[3] The multipurpose economic zone was set up with the intention to attract foreign investors. Notably, the port provides a link to the Lao People's Democratic Republic and Thailand. The Management Board of the economic zone was established with the mandate to supervise planning and construction activities and report to the Ha Tinh government (Wit and others, 2012, p. 6). The Provincial People's Committee has the authority to appoint staff of the Management Board, which, in turn, has the authority to license the projects invested in the economic zone. As of 2012, the Vung Ang economic zone had more than 90 licensed projects with a total registered capital of 240 trillion Viet Nam dong ($10 billion) (Wit and others, 2012, pp. 16-17).

[2] Decision No. 1786/QD-TTg of 27 November 2012.

[3] Decision No. 72/206/QD-TTg of 3 April 2006.

Figure 2. Location of Ky Anh district in Ha Tinh province, Viet Nam



Source: Nguyen and Hens (2019).

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Hung Nghiep Formosa Ha Tinh Steel project in the Vung Ang economic zone

The case study in this paper involves a project established in the Vung Ang economic zone set by the Hung Nghiep Formosa Ha Tinh Steel Company under the backing of the Formosa Plastics Group, which is based in Taiwan Province of China. The project for an integrated steel mill and Son Duong port was granted an investment certificate in June 2008. It covers an area that exceeds 3,300 hectares and has the total chartered capital of approximately $10 billion (phase I); under phase II, the capital is expected to increase to $27 billion (Phuong Linh, 2014). This is currently the largest FDI project in Viet Nam. The land lease period for the project is 70 years and the land rent is more than 96 billion Viet Nam dong for the whole lease period (Minh Hong, 2014). Construction of the steel plant began in 2012 after three years of waiting for site clearance. The plant entered the production stage in May 2017 with the operation of the first blast furnace; the operation of the second furnace was launched in May 2018.

IV. THE HUNG NGHIEP FORMOSA HA TINH STEEL PROJECT ENVIRONMENTAL DISASTER IN 2016 AND THE DEBATES ON DECENTRALIZATION OF FOREIGN DIRECT MANAGEMENT IN VIET NAM

In April 2016 an unprecedented marine environmental disaster occurred on the central coast of Viet Nam, attracting attention across the country. Massive deaths of fish spread from Ha Tinh province to the other three provinces along the North Central coast of Viet Nam. On 6 April 2016, off the coast of Ky Anh district in Ha Tinh province, local people discovered large amounts of dead fish floating in the sea. Starting on 10 April 2016, dead fish were found along the coast of Quang Binh province. From 16 April to 19 April 2016, dead fish were also found along the coastline of Quang Tri province. In Thua Thien Hue province, dead fish were found washed up on the beaches from 15 to 21 April 2016. Tons of fish carcasses floated on the sea and washed ashore every day until 4 May 4 2016 (figure 3). For the first time the people of Viet Nam witnessed large-scale deaths of fish, which caused panic.

Figure 3. The spread of dead fish along the North Central coast of Viet Nam, April 2016

Source: Hookway (2016).

Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

A long investigation of the incident was conducted, stirring up a lot controversy and turmoil among the general public. During that time the Hung Nghiep Formosa Ha Tinh Steel Company was suspected to be the culprit behind the massive deaths of fish, as large sewage pipes that connected the plant with the ocean had a strong odor at the mouth of the pipes where wastewater was discharged into the sea. The company denied any responsibility for the disaster and insisted that the discharged wastewater was properly treated. In the initial stage of the investigation, the Government also indicated that the cause of the disaster might be natural (red tide or algal bloom phenomenon), as there had been no evidence proving the company was involved in the mass fish deaths. On 25 April 2016, a spokesman for the company issued a shocking statement. The company spokesman suggested that Viet Nam choose either fish or steel. In other words, he suggested that the Vietnamese should decide if they want to catch fish or to build a modern steel industry. This statement provoked a fierce public outcry. In late April 2016, the first protest in Quang Binh province marked the beginning of multiple marches and protests in which thousands of Vietnamese called for a clean environment, government transparency and the disengagement of the Hung Nghiep Formosa Ha Tinh Steel Company. Larger demonstrations took place in Ha Noi and Ho Chi Minh City in early May 2016.

After two months of the investigation, it was concluded in late June 2016 that the plant of the Hung Nghiep Formosa Ha Tinh Steel Company caused serious pollution of the sea, leading to massive death of fish along the central coast of Viet Nam. The Government report indicated that the cause of the massive death of fish could be attributed to the plant's wastewater. It contained toxic chemicals, such as phenols, cyanide and iron hydroxide, that exceeded the permitted level and was released into the sea during the plant's test run phase. In addition, 53 violations in the process of construction and the test run of the production lines were discovered, including an unauthorized change to a dirtier production technology,[4] which released a lot of toxic waste, and the lack of wastewater treatment, as committed in the approved environmental impact assessment report. Admitting its responsibility for the wrongful discharge of toxic chemicals in the sea, the company apologized to the Government and the entire population of Viet Nam and agreed to pay $500 million in compensation for the incident, which is considered to be one of the worst environmental disasters in the modern history of Viet Nam.

Local economies were heavily affected by the disaster as many depend on sea-based industries, such as fishing, aquaculture and sea tourism, which stagnated following the disaster. The total value of damage declared was approximately 1,947

[4] Regarding the unauthorized change of production technology, the company deliberately changed from dry coke quenching technology committed in the environmental impact assessment to wet coke quenching technology, which is more polluting. The dry coke system is modern and cleaner, but more costly.

billion Viet Nam dong (Ha and Dang, 2017). The disaster also had a very negative impact on society in general. In addition to concerns about food safety, the incident also brought about social insecurity, as local people worried about loss of livelihood, unemployment, debt and bankruptcy. The Government acknowledged that the incident reduced people's confidence in the Government. People questioned the process used to appraise and approve the investment, and the ability of the authorities to respond to the emergency, as indicated in the following comment made by an environmental consultant: "Vietnamese who are rarely consulted about and aware of investment projects face a big crisis of confidence" (Nguyen, as cited in Pham and Chau, 2016). Regarding the environment, it is considered to be "the most serious environmental disaster Viet Nam has ever faced" (Mai and Yu-Huay, 2016); the environmental damage caused by the disaster cannot be denied. The discharge of toxic chemicals from the plant polluted 200 kilometres of coastline. The marine ecosystem was severely affected, with more than 100 tons of fish killed and coral reefs destroyed (Huu Tuan, 2016). It will probably take decades for the regional marine environment to completely recover from the toxic spill.

After the incident, several measures were taken to deal with the discharge from the steel plant. The Ministry of Natural Resources and Environment set up an interdisciplinary council to monitor the remedial measures. The company was required to set up biological indicator ponds to monitor the quality of wastewater. In addition, the company cooperated with Ha Tinh province to invest in an industrial waste treatment plant. To date, Hung Nghiep Formosa Ha Tinh Steel Company has rectified 52 out of the 53 violations. The only issue still remaining is technology conversion. The company has committed to a change in the production technology by 2019. With support from the Ministry of Natural Resources and Environment, the Ha Tinh Department of Natural Resources and Environment is operating an online monitoring centre that is connected directly to the unloading point of the plant to supervise the discharge from the plant. The sea appears to be recovering. Fishermen have started fishing again though the amount of fish caught is very limited.

Debates on the effectiveness of decentralization in the field of foreign direct investment management using the case of the Hung Nghiep Formosa Ha Tinh Steel project as an example

The following includes highlights from debates on the effectiveness of the decentralization of FDI management.

Decentralization of FDI management has brought about positive impacts on local administration and the development of Ha Tinh province.

It cannot be denied that the decentralization policy helps to increase local autonomy and the activeness of the local government. According to an official of the

Department of Planning and Investment of Ha Tinh province (personal communication, 24 August 2018), "decentralization policy makes the local government more proactive. Based on local development plans and its own strengths, the local authority sets out specific policies to attract investment in areas where the province has comparative advantages". In addition, decentralization encourages the simplification of administrative procedures in FDI management, as the implementation of investment procedures at the local level is more rapid and simpler. Moreover, in order to create a favourable investment environment, the provincial government has also made efforts related to public administration reform, while supporting businesses to complete the necessary procedures, as stated by a Ha Tinh Investment Promotion Center official.

Ha Tinh province has attracted projects, which substantially contribute to the local development in many aspects. From an economic perspective, the inflows of FDI have helped to increase local revenue and facilitated the restructuring of the local economy by raising the proportion of the industrial sector in the economic structure (personal communication, 24 August 2018). In fact, one official of the Department of Development and Planning pointed out that owing to large FDI projects, the economic growth rate of Ha Tinh increased to more than 30 per cent in 2017, compared to only 9 to10 per cent in the previous years (personal communication, 24 August 2018). From a socioeconomic perspective, FDI projects have helped to create jobs and improve the lives of local people, while from a political perspective, Ha Tinh has become one of the popular investment destinations of the country (personal communication, 24 August, 2018). In particular, the Hung Nghiep Formosa Ha Tinh Steel project is a very crucial FDI project. In addition to contributing significantly to the local budget, it has facilitated "vibrant development for the region and promotes the development of other economic sectors" (personal communication, 24 August 2018).

Negative impacts of decentralization on FDI management at the local level

Despite the beneficial effects of decentralization of FDI management, there are concerns that it has resulted in lax management of FDI projects, which, in turn, led to the environmental disaster in 2016. Arguably, the local authority has sought to attract FDI projects without careful consideration. When looking back on the licensing process for the Hung Nghiep Formosa Ha Tinh Steel project, it is surprising that such a large project with wide-ranging impacts and high environmental risk was approved so easily despite sketchy reports. Even though the former chairman of the People's Committee indicated that the appraisal and approval of the project were carried out under the "right procedure" and "agreed to by 12 ministries" (Vnexpress, 2016), the approval of the project was undoubtedly a risky decision. This project belongs to the category of industries with high environmental risks. Furthermore, its parent company was notorious for being involved in many environmental damage cases in Cambodia and the United

States. In Taiwan Province of China, the company was on the list of the top-10 polluters as pointed out by the Ethecon Foundation.[5]

Moreover, the Hung Nghiep Formosa Ha Tinh Steel project received extra-legal incentives from local authorities. Regarding land lease, the Investment Law 2005 stipulates that the provincial government can only grant land leases up to 50 years, except in the case of necessity where the Government shall decide a longer term for the project. Nonetheless, an investment licence was granted for 70 years. This violation was pointed out by the Government Inspectorate in 2015. However, it was not rectified as the prime minister agreed to keep the 70-year lease term in order to ensure the stabilization of the project. Notably, it should be emphasized that the extension of this land lease term did not receive approval from the prime minister from the beginning (Hoang, 2016). As Ha Tinh was a poor province and eager for investment capital at that time, the approval of a highly risky project along with extra-legal incentives might imply that the local authority accepted risky projects for the sake of economic development without rigorous consideration, especially in terms of the environment. It also suggests that when power is vested in the local government, it can be used ineffectively, wrongly or abused in a way that may harm the society, such as in the case of the Hung Nghiep Formosa Ha Tinh Steel project disaster in 2016.

The disaster also exposed the weaknesses in the supervision of the project after the approval. Because of the lax monitoring process, serious violations were not promptly discovered, eventually leading to a terrible marine life disaster. It was not until the incident that, 53 violations committed by the company, including the unauthorized change to dirtier technology, were discovered. The Ministry of Natural Resources and Environment official explained that the Ministry conducted an inspection in May 2015, but at that time the plan was still under construction. Hence, the inspection was limited only to some items and the technology issues were not reviewed (Thu Trang, 2016). Nevertheless, the monitoring of the project should have been conducted on a regular basis with coordination of the authorities at all levels. No violations were found until the disaster occurred, indicating that relevant State agencies had not fulfilled their responsibilities.

Regarding the intergovernmental relations and the issue of accountability

A notable issue that has emerged after the disaster was the confusion in determining the scope of responsibility among State agencies involved in the project, which was closely associated with decentralized FDI management. Concerning project approval procedures, although the Management Board of the Vung Ang economic zone was the body that granted the investment certificate to the Hung Nghiep Formosa Ha

[5] See www.ethecon.org/en/902.

Tinh Steel Corporation, project approval was needed from the central Government based on consultation with relevant ministries. Eight years since the licensing of the project, almost all the relevant ministries, such as the Ministry of Science and Technology, the Ministry of Industry and Trade and the Ministry of Natural Resources and Environment, have denied any responsibility by emphasizing the decisive role of the local government in managing the project.

Remarkably, there was confusion over responsibilities in monitoring the project between the central and local governments, specifically from the perspective of environmental protection. The Ha Tinh government has insisted that the main responsibility for environmental supervision rested with Ministry of Natural Resources and Environment, as the authority to approve the environmental impact assessment belongs to this Ministry. The Ministry of Natural Resources and Environment has argued that although approval of the assessment was the responsibility of the Ministry, monitoring the implementation of the project was to be handled by relevant authorities, including the People's Committee of Ha Tinh. Accordingly, the provincial authorities were tasked with the direct supervision of the project (Nam Phuong, 2016). The unclear determination of responsibilities related to the project ultimately led to the shirking of responsibilities among State agencies.

V. CHALLENGES IN THE IMPLEMENTATION OF DECENTRALIZATION IN FOREIGN DIRECT INVESTMENT MANAGEMENT THROUGH THE CASE STUDY OF HUNG NGHIEP FORMOSA HA TINH STEEL PROJECT

Evidence shows that decentralization led to negligence with regard to FDI management, especially at the local level. Consequently, tasks were not carried out in a strict and effective manner, resulting in serious consequences such as the Hung Nghiep Formosa Ha Tinh Steel project disaster. In addition, State agencies tended to shift the responsibility to each other when the problem occurred. In exploring the reasons behind these issues, six main themes were identified through in-depth interviews with Ha Tinh officials. Below is a discussion of predominant challenges acknowledged by the local government officials in managing FDI projects under the decentralized set-up in Viet Nam, which have emerged from the case study.

Limited competence of the local government

One of the key challenges for the local government to carry out the responsibilities associated with decentralized FDI management is its limited appraisal competence, specifically in collecting and evaluating information about potential investors and investment projects during appraisal procedures. Personal interviews with officials of Ha Tinh Department of Planning and Investment have revealed that the project appraisal

was mainly based on the reports submitted to local agencies by investors. Information about investors is basically investigated through the Internet, which is often incomplete and difficult to verify. In particular, the authorities face great difficulties when dealing with new investors: "If an investor has already invested in Viet Nam, we have channels to collect information. However, if it is a first-time investor in Viet Nam, collecting information is very difficult, sometimes information is also unavailable on the Internet". Moreover, "new technology makes appraisal difficult because of inadequate local competency" (personal communication, 24 August 2018).

Limited technical and managerial competence also poses challenges for local authorities in the supervision of FDI projects. Local governments appear to lack adequate competence to effectively monitor these projects, as the projects are often large and apply complex technology, while the knowledge and ability of local authorities are limited. In particular, local authorities lack the capability to evaluate and manage some of the more advanced technologies, according to a Ha Tinh Department of Natural Resources and Environment official (personal communication, 24 August 2018). In response to questions from press agencies about the failure in monitoring of Hung Nghiep Formosa Ha Tinh Steel project, the Ha Tinh government has admitted that it "never has dealt with such a big project and that the required technical equipment for inspection and supervision was also lacking. In fact, the Ha Tinh Department of Natural Resources and Environment conducted the inspection but failed to detect any violations because of the lack of technology" (Vnexpress, 2016).

Insufficient resources at the local level

The weak level of competence at the local level in performing decentralized functions is closely associated with insufficient resources, including human resources, financial resources and technical resources. First, environmental supervision is inefficient because of a staffing shortage, as exemplified by the Department of Natural Resources and Environment official: "human resources is limited by a personnel quota as well as the salary fund, while the natural resources and environment sector requires a direct work force". The official notes that in comparison with southern provinces, staff devoted to the environment issue in the Ha Tinh province were four to five times fewer. Although the southern provinces have more projects, insufficient manpower responsible for environmental monitoring is still significant for Ha Tinh: "They (governments of the southern provinces) have dozens of environmental inspectors, while here (Ha Tinh province) there are only one or two people". He also has criticized the policy of staffing reductions, as it applies to the entire State machinery without taking into account the characteristics of each sector:

> There are sectors and agencies with heavier workloads; they need more personnel. In particular, environment management is a sector that requires employees to go to the field, and the environment has a long-term impact on

> the development of society. It can affect the economy and other industries, but now environment management is also part of the general trend of staff reduction (personal communication, 24 August 2018).

In addition, funding for the environment sector is very limited, especially in poor provinces, such as Ha Tinh. The Department of Natural Resources and Environment official admits with hesitation that the budget for the environment is small: "In the southern provinces, investment in the environment meets the requirements, while in Ha Tinh province, it is very limited" (personal communication, 24 August 2018). As a result of budget constraints, there is a lack of specialized analytical equipment for environmental monitoring. Local agencies do not have waste analysis equipment. Some chemical compounds used in wastewater, such as phenol and cyanide, cannot be analyzed at local agencies, and need to be sent to large laboratories to be analysed (personal communication, 27 August 2018). It is evident that the local government cannot fulfill its responsibilities to supervise the FDI projects with its limited resources. Implementing decentralization without accompanying it with the required resources results in management inadequacies. The Department of Natural Resources and Environment official has also raised this issue and asked for support from the central Government:

> The current decentralization regulations have limitations when considering issues, such as human resources and equipment, especially equipment which is difficult for local governments to invest in on their own. If decentralization of authority were to come with support from the central Government for investment in equipment, it would be more effective (personal communication, 24 August 2018).

Inadequacies in specialized legal framework

Another important factor behind the lax supervision of the FDI project is related to the permissive licensing procedures. To attract investors, the law on investment has been relaxed to a large extent, thereby easing market entry for foreign investors. As described by the Department of Planning and Investment official, the entry regulations are not strict enough and the investment procedures do not provide enough details for collecting detailed information. He notes the following:

> Unlike a public investment project that requires a feasibility report and then the authorities verify all the items in the report; for this (FDI project) no one appraises it. The authorities only check documents submitted by investors and consider the appropriateness with local development planning and local land use planning. In terms of the environment, after being licensed, investors make an environmental impact assessment (personal communication, 24 August 2018).

In addition, the relevant legal provisions are contradictory. As pointed out by the local officials, the Law on Investment and the Law on Environmental Protection contradict each other. The Law on Environmental Protection requires an environmental impact assessment prior to investment approval as a basis for project approval, while the Investment Law does not stipulate this. This causes confusion for local agencies when performing their functions. The officials also have indicated that "if an investor is required to make an environmental impact analysis and it is is not approved for investment, the question is who will bear this cost", implying that in reality the environmental impact analysis, which is an essential tool to evaluate environmental impacts of projects, is often omitted. With such legal loopholes, the existence of risky projects, such as the Hung Nghiep Formosa Ha Tinh Steel project is inevitable.

Not only are the provisions related to the approval of FDI projects not strict enough, but the regulations on project supervision are also incomplete, especially with regard to environmental regulations. In reviewing the Hung Nghiep Formosa Ha Tinh Steel project case study, it was noted that press agencies had criticized the Ha Tinh authority for licensing this project even though the investor had a bad reputation for polluting the environment in some other countries. An official of the Ha Tinh Department of Planning and Investment attributed this issue to the weak State management system or poor management capacity, emphasizing the lack of regulations on environmental criteria to supervise the projects efficiently. "Sometimes the authorities know about bad information, but because of their subjective will, they think that investors, when investing in Viet Nam, must follow our standards which we can supervise so that no mistake occurs. However, in the end, due to poor management capacity, mistakes have occurred. We do not even have regulations on fixed criteria, for example, there are no regulations on environmental monitoring systems", he said. In his view, this relates to "management inadequacy from the ministry level" and a "systematic issue" (personal communication, 24 August 2018). The Department of Natural Resources and Environment official also affirmed that there were no mandatory regulations for the projects to have an online monitoring system. The installation of an online monitoring system to oversee the discharge from the project, with the aim to avoid similar disasters, was required only after the Hung Nghiep Formosa Ha Tinh Steel project disaster had occurred: "If this disaster had not happened, perhaps there would have been no online monitoring system even now", he said (personal communication, 24 August 2018). The investigation of the disaster has revealed loopholes in the law on investment and environment, including the lack of standards for the construction of waste treatment facilities and monitoring system.

Furthermore, the management of FDI projects faces impotent regulations concerning sanctions to deal with violations. In the case of the Hung Nghiep Formosa Ha Tinh Steel project disaster, it is contended that the punishment for violations caused by the company, including a compensation of $500 million, is not based on any legal standard. There is an opinion claiming that this violation should have been treated as

a criminal offense, instead of as only an administrative offense. Questions were posed about the compensation of $500 paid by the company: "What if the money is not enough to compensate the people? Do localities have to overcome the shortfall themselves?" (Nhi, 2016) There is a popular belief that if enterprises violate the regulations, State agencies may withdraw the investment license of the project. Nonetheless, the application of sanctions to FDI projects is very difficult. As indicated by local officials, project withdrawal is difficult as it leads to lawsuits:

> Because after allocating land to the project, the investor has assets on the land, that is why taking back the land is difficult. Many lawsuits have lasted more than ten years. When the lawsuit takes place, especially international lawsuits, the situation becomes very complicated. Our law now is relaxed, but handling post-licensing situations is not easy. Regarding current sanctions, in addition to administrative sanctions, the cases where project withdrawal can be applied are limited to only a few conditions. There are many conditions for withdrawal that cannot be applied (personal communication from a local official, 24 August 2018).

Weak coordination mechanism associated with unclear distribution of responsibilities between State agencies

Another challenge that local governments are facing regarding decentralized FDI management is the lack of coordination between central and local agencies. When asked about shifting the responsibility among agencies related to Hung Nghiep Formosa Ha Tinh Steel project disaster, the Department of Planning and Investment official has explained that the unclear mechanism of coordination led to the confusion in determining the accountability among relevant agencies. He has added the following: "Probably not only Ha Tinh but also for other localities, there is a lack of coordination between the local and the national ministries", implying that coordination is weak throughout the whole system (personal communication, 24 August 2018).

In fact, the roles and specific tasks of each party under the coordination mechanism has not been clarified, in particular the defining of the coordinating role. The most prominent accountability dispute in the Hung Nghiep Formosa Ha Tinh Steel project case is related to the function of environmental supervision between the Ministry of Natural Resources and Environment and local authorities. The official from Ha Tinh Department of Natural Resources and Environment has asserted that the role of the provincial authorities concerning environmental supervision is defined as a coordinating role, meaning that provincial agencies are only to participate when asked by the agency that assumed the main responsibility, i.e. Ministry of Natural Resources and Environment. Accordingly, local authorities are tasked with the coordinating function without assigning specific tasks: "The mechanism is not clear. Because we hold the coordinating function, we can only take coordinated actions as requested; we cannot

take the initiatives relating to monitoring and conducting inspections. Local authorities cannot arbitrarily conduct inspections when there is no regulation" (personal communication, 24 August 2018). In essence, the lack of coordination among State agencies stems from unclear distribution of responsibilities among relevant agencies.

Evidently, weak coordination and unclear distribution of responsibilities between central and local agencies has undermined the significance of decentralization as a strategy to increase local responsiveness and accountability. Because of better access and frequent interactions at the local level, it is clear that local authorities have an advantage over central agencies to carry out daily monitoring of the projects. However, the absence of specific regulations in this regard, and the unclear assignment of tasks among relevant agencies make it difficult for local authorities to conduct monitoring activities regularly. Because of this, the offices of the provinces are often passive and depend on the central agencies' plans and directives (personal communication, 27 August 2018). Furthermore, the confusion associated with the coordinating role weakens the sense of responsibility among local agencies, as they do not recognize the legal binding of any particular responsibility. Consequently, public accountability has deteriorated, resulting in the Hung Nghiep Formosa Ha Tinh Steel project disaster, which, in turn, has incited public outrage and led to the uncovering of a series of serious violations, an inevitable consequence of inadequate monitoring and irresponsibility of the authorities. Empowerment of the local government without accompanying it with accountability may create gaps in management, and make decentralization counterproductive.

The dilemma concerning economic development and environment protection

It has been revealed that State agencies, especially local government, has encountered the dilemma of economic development or environment protection while pursuing FDI projects. To foster development, Viet Nam has promoted foreign investment in many key industries that have high environmental risks, such as heavy industries. It would be ideal if attracting investment and protecting the environment could be achieved concurrently. This, however, is a pressing issue for local governments and the central Government. Though the Government has stated its preference for projects that are environmentally friendly and high-tech in nature, many projects of low quality and with high environmental risks are ongoing in many provinces.

It is worth noting that many developing countries, including Viet Nam, have attracted foreign investment, partly owing to low environmental cost. The reason a discharge monitoring system was not required even for such a large huge and risky project, such as the Hung Nghiep Formosa Ha Tinh Steel project, is related to investment costs and the investment promotion issue, as stated by an official of the Ha Tinh Department of Natural Resources and Environment: "Operating this (discharge monitoring system) is very expensive, costing tens of millions of dollars annually, and

only large businesses can afford it. If it is mandatory for them to install the system, the environmental costs will be very high. Then, of course the ability to attract investment will decrease" (personal communication, 24 August 2018). He has also argued that economic development is the priority at the country's current level of development: "At this stage we have to accept that because we need economic development. When the economy is more developed, we may raise the environmental costs, remove the 'dirty' guys, open to the 'clean' ones. This is for the later stage and it requires consideration at the national level with environmental criteria" (personal communication, 24 August 2018). Presently, the pressure for economic development in Viet Nam is coercing local governments, especially those representing poor provinces, to more readily accept risky projects for the sake of economic growth while ignoring potential environmental impacts. In addition, as indicated by the Department of Natural Resources and Environment official, the number of inspections has been reduced to avoid disrupting the operation of businesses. This preferential policy is limiting environmental supervision of foreign invested projects.

Lack of public participation

In retrospect, with regard to the Hung Nghiep Formosa Ha Tinh Steel project case, the absence of public participation in the decision-making process and the post-approval supervision need to be reviewed. When the investor applied for an investment licence, during the appraisal period, the provincial government was required to consult with the relevant local departments. After that, the interactions between the local government and the central government and among relevant State agencies to facilitate the approval of the project took place. According to the regulations, within 13 days after granting approval of the investment, the project information must be sent to the relevant departments so that they can deal with matters within their jurisdictions. It appears that the decision-making process for an investment project inside the economic zone failed to involve public participation. The process of appraisal and approval was closed to State agencies. During the operation of the project after approval, the role of public supervision became more limited, as there was no specific mechanism to involve people participation. Viet Nam has issued many regulations to require public participation, ensuring the role of sociopolitical organizations and communities, especially at the grass-roots level, in monitoring and contributing opinions for policies, plans, programmes and socioeconomic projects. Despite this, a mechanism for the general public to monitor foreign investment projects does not exist. The Hung Nghiep Formosa Ha Tinh Steel project disaster has raised the issue of promoting the role of sociopolitical organizations and local people in evaluating and monitoring projects. This fits well with the Vietnamese motto "People know, people discuss, people do, people check" on public matters, including FDI management.

VI. CONCLUSION

In general, decentralization is neither completely positive nor negative. If designed well, it can move decision-making closer to the people and improve the efficiency of State management. If not, it will have adverse effects. The process of decentralization is extremely complicated, as it involves many factors, which individually and interactively affect outcomes, particularly for developing countries.

In Viet Nam, under the decentralization strategy, the authority of investment management has been strongly decentralized to the local government. Despite the potential positive impacts, decentralization has resulted in lax supervision of FDI projects, which has directly affected the sustainable development of the country. The approval of risky projects, such as the Hung Nghiep Formosa Ha Tinh Steel project, has resulted in serious consequences, specifically with respect to the environment.

What is striking about the situation of decentralization of FDI management in Viet Nam is that the local government has been given large authority to promote, attract, facilitate and approve investment projects especially in poor areas, such as Ha Tinh province, even though it lacks the capacity to do so. In other words, local governments do not have sufficient competence and resources to carry out these delegated functions. Furthermore, as a result of the pressure to foster economic development, the local government has tended to favour large-scale projects without paying due attention to the potential environmental impacts. In addition, because of the lack of coordination and the confusion about the extent of authority between the local and central government, no authority has assumed responsibility for monitoring the projects. Combined with other issues, such as an inadequate specialized legal framework and lack of public participation, these are important reasons why decentralization of FDI management in Viet Nam has not worked properly. Significantly, the Hung Nghiep Formosa Ha Tinh Steel project's environment disaster happened as a result of the accumulation of these issues.

The investor is arguably responsible for the environmental damage, but the responsibility of all State agencies from the central to local levels in investment management and minimizing risks is obvious. Without clarifying the responsibilities of the involved parties along with a strict accountability mechanism, such environmental incidents are inevitable.

The case of the Hung Nghiep Formosa Ha Tinh Steel project has clearly demonstrated that in the context of decentralization, Ha Tinh authorities have faced great challenges in managing FDI projects. Decentralization has been vigorously implemented while local capacity has failed to attain the required skills to be effective. Intergovernmental relations have remained an obstacle to decentralization; the civil society is not strong enough; and the pressure of economic development, coupled with

inadequate regulatory framework, induces unpredictable consequences, which can be harmful to the environmental and social welfare. The evidence from this study supports the view that several prerequisites need to be in place in order to ensure beneficial outcomes of decentralization.

In particular, these findings suggest that decentralization of FDI management needs to be reconsidered in several ways. Arguments can be made against implementing a decentralization strategy because of the incompetence of local governments in performing delegated functions. Though it is true that local government authorities do not have the capability to make complex decisions regarding investment projects, the same can be said about the central Government authorities. It is uncertain if such a disaster could have been avoided if the project had been fully under the authority of the central Government, while the benefits of decentralization are undeniable if it is smoothly implemented. The issue is not that local governments should not have the authority to undertake investment decisions. The issue is perhaps that there should be clarity regarding the scope and areas of authority between local and central authorities, and a proper coordination process between the two levels of government. It is worth noting that decentralization per se is not the problem, but instead the problem is related to the way it has been implemented. Without being designed or implemented properly, decentralization may have negative impacts. Adverse effects on environmental is one possible consequence of the decentralization in FDI management. In these cases, decentralization is deemed to be “good in theory, but bad in practice” (Lalitha, 2002, p. 138).

By reviewing the Hung Nghiep Formosa Ha Tinh Steel project case in depth, the challenges and risks in FDI management under decentralization, especially in poor regions, which are desperately in need of investment but have limited managerial capacity, are illuminated. This study has important implications for more effective management of similar FDI projects in underdeveloped regions in future. In this paper, the central argument maintains that adequate delivery mechanisms for decentralization needs to be in place in a systematic way in order to achieve effective decentralized management. This entails an adequate regulatory framework on the management of FDI, a clear demarcation of responsibilities and accompanied accountability among State agencies, a proper coordination process between local and central government, increased local capacity and active participation of the civil society. Further research with more refined data could make it possible to explore this topic more fruitfully.

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DEATHS AT SEA IN THE PACIFIC ISLANDS: CHALLENGES AND OPPORTUNITIES FOR CIVIL REGISTRATION AND VITAL STATISTICS SYSTEMS

*Carah Figueroa, Gloria Mathenge, Christine Linhart and Philip A.S. James**

Accurate and reliable death statistics produced by civil registration and vital statistics systems are essential for health planning and programme evaluation. The quality of death registration data in Pacific island countries and territories remains suboptimal. Data on deaths occurring at sea are especially limited. While coastal and oceanic activities are the norm and essential to the livelihoods of Pacific island populations, such activities pose risks for accidents at sea, especially those involving small-scale vessels. In this paper, the scale of deaths at sea associated with small vessels in three Pacific island countries or territories over the period 2008-2017 is investigated using data from the health, civil registry, and police and fisheries departments, and reports produced by national statistics offices, ministries of health, the Pacific Community, the World Health Organization and media sources. Data on deaths at sea were found to be fragmented among multiple sources and missing key information on age, sex, and cause. Standardized procedures for reporting deaths and accidents at sea and harmonized data sharing between local communities and government agencies are urgently needed to improve civil registration and vital statistics systems and sea safety in the Pacific island subregion.

JEL classification: I12, I18

Keywords: mortality, Pacific islands, civil registration, vital statistics, sea accidents

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I. INTRODUCTION

Mortality level is a key indicator of population health. Civil registration is the routine collection by governments of information on vital events, such as births and deaths, occurring within a country. Accurate and reliable mortality statistics produced by civil registration and vital statistics systems are essential for planning and evaluating policies and programmes, and to maximize the return on investments in health. Civil registration of death is integral to promoting individual rights, managing identity and providing social protection (United Nations, 2014). The availability and quality of death data from these systems in Pacific island countries and territories remain suboptimal. Critical weaknesses in the processes of reporting deaths to civil registration offices contribute to gaps in data on deaths; civil registration systems are generally considered to be incomplete in most Pacific island countries and territories.[1] Apart from a few countries where government agencies are designated informants, registration of deaths is largely done passively, relying on the relatives of the deceased to report the occurrence of a death to the responsible officials (Pacific Community, 2016; United Nations, 2014). The reliability of these reporting processes remains compromised in the absence of incentives to encourage the registration of deaths, such as the inheritance of land and property, and funeral and bereavement grants, as issued by the Governments of Nauru, Niue and the Cook Islands (Pacific Community, 2016). Obtaining accurate and timely data and statistics on death from civil registration records is further limited by the subregion's widely dispersed islands and sparse populations, inadequate technical and financial resources, and communication constraints (Brisbane Accord Group, 2015).

The scale of deaths that occur in the sea remains uncertain in Pacific island countries and territories, even though it is a well-recognized problem. Having accurate data on deaths at sea is especially needed as the Pacific Ocean forms the axis of economic and social activity of the Pacific island people. Ninety-eight per cent of the subregion is ocean, 27 per cent of households in the Pacific participate in fishing activities (Pacific Community, 2017), and formal and recreational sea sporting activities and inter-island transportation are the way of life. Given the intensity of maritime activities, vessel users are frequently exposed to numerous factors, including, among them, bad weather, engine failure, poor vessel construction, overloading, prolonged trips, and limited safety equipment, training or knowledge (WHO, 2014), which increase the risk of accidents at sea, such as collisions, groundings, drifting, fires, explosions,

[1] Coverage is a measure of the percentage of the population within a geographical area that the civil registration and vital statistics system reaches. Completeness is the estimated percentage of deaths covered by the civil registration and vital statistics system that is registered with cause of death information within a specified time period (United Nations, 2014).

and vessel loss. In particular, small-scale vessels[2] are used extensively by Pacific islanders for these water activities. As such, most maritime accidents[3] involve small-scale fishers and vessels (Danielsson and others, 2010; Gillett, 2003). Though largely undocumented, sea accidents are believed to constitute a notable share of the morbidity and mortality in the region.

II. REGISTRATION OF DEATHS AT SEA

Particular challenges arise related to the registration of deaths that occur in the sea. Regarding deaths that take place aboard vessels, procedures to ensure that the captains of registered vessels report and facilitate the registration of such events could be considered relatively straightforward; however, processes for how such reporting should be carried out[4] are not clearly set out in the civil registration laws of most countries in the Pacific. The efficiency and completeness of registration of deaths aboard vessels is also subject to whether such vessels are registered and how well governments (ports and maritime authorities) maintain records of vessels in the sea, including the identity of the passengers. Unfortunately, under-registration of deaths at sea are likely to occur among children (Carter and others, 2012), or among people who have low level of education, poor access to health services, or reside in hard-to-reach areas, rural households or lower-income households (Brisbane Accord Group, 2015; Rao, Bradshaw and Mathers, 2004; Powell, 1981), such as those engaged in small-scale fishing activities (Adams, 2012). Weak civil registration policies coupled with lack of understanding of the legal requirement and importance of death registration remains a fundamental challenge in this regard (Pacific Community, 2016; United Nations, 2014).

In addition, there are difficulties in certification and death registration for missing persons at sea. Incidents may be reported to the police, but most legislation requires a minimum time period (up to seven years) of disappearance before a missing person is registered as "deceased". In most Pacific island countries and territories, unless there is

[2] The definition of small-scale vessels varies between Pacific island countries and territories. In this study small-scale vessels are considered to be locally based boats of less than 15 metres in length (Gillett, 2003).

[3] "Accident" at sea refers to any occurrence on board a vessel, involving a vessel, or associated with the activities of a vessel at sea whereby (a) there is death or injury to any person on board, or any person is lost or falls overboard; (b) the vessel is lost or presumed to be lost at sea; or is materially damaged; or (c) taking into account its circumstances, the occurrence might have been liable to cause serious injury or damage to the health of any person (adapted from Danielsson and others (2010) and IMO (2008)). The term "accident" is also used in the International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD-10) for coding external causes of morbidity and mortality (WHO, 2017).

[4] Including distinguishing procedures for registration of deaths occurring in territorial versus high seas.

direct evidence of death, such deaths at sea are not included in official national mortality statistics. A legal death certificate, however, is important for family members of the deceased as evidence of identity and family relationships, and for right to claim insurance and land inheritance benefits (Pacific Community, 2016; United Nations, 2014). A delay in the issuance of a death certificate can have serious social and economic impacts for family members of the missing person, especially if the person was the breadwinner. The cause of death at sea cannot be determined in the absence of a medical examination, and the individual is often presumed drowned.

III. CERTIFICATION OF CAUSE OF DEATH AT SEA

Accurate and comprehensive details on a death at sea are necessary to ensure precision in the subregion's cause of death statistics and to develop appropriate follow-up public health measures to address the problem. In accordance with the tenth revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) rules set by the World Health Organization (WHO), all deaths should be registered with "all the diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced such injuries" (WHO, 1993). From these reported conditions, a single cause known as the "underlying cause of death" is selected for tabulation and reporting purposes. The purpose of selecting the underlying cause of death is to identify the disease, injury or circumstance that is most amenable to prevention and intervention strategies from a public health perspective. Accordingly, it is extremely important that the circumstances surrounding a death at sea are well recorded and as detailed as possible.

Classification and coding of external causes of mortality (accidents, intentional self-harm, homicides, and those of undetermined intent) is provided in ICD-10, chapter XX (codes V01-Y98). In chapter XX of ICD-10, a range of possible causes of deaths at sea are discussed (table 1). For example, ICD-10 codes V90-V94 may be used for deaths resulting from accidents to vessels or on board vessels. Fourth-character subdivisions allow for the type of vessel to be specified, such as merchant ship (.0), passenger ship (.1) and fishing boat (.2), or unspecified (.9). Other causes of accidental injury at sea are drowning and submersion while in the water or following a fall into the water without accident to the vessel; fatal attacks from marine animals, such as sharks; and diving with insufficient air supply (table 1). The nature of the fatal injuries inflicted, such as head injuries, heatstroke, or decompression sickness, are covered by ICD-10 codes in chapter XIX. Codes from chapters XX and XIX should be used in cause of death tabulations.

Table 1. Causes of death which could occur in the sea

ICD-10[a] code	ICD-10[a] description
V90[b]	Accident to watercraft causing drowning and submersion due to: • boat overturning or sinking • falling or jumping from burning ship or crushed watercraft • other accident to watercraft
V91[b]	Accident to watercraft causing other injury including: • burned while ship on fire • crushed between colliding ships • crushed by lifeboat after abandoning ship • fall due to collision or other accident to watercraft • hit by falling object as a result of accident to watercraft • injured in watercraft accident involving collision of watercraft • struck by boat or part thereof after falling or jumping from damaged boat
V92[b]	Water-transport-related drowning and submersion without accident to watercraft, but as a result of an accident, such as: • fall from gangplank, ship, or overboard • thrown overboard by motion of ship • washed overboard
V93[b]	Accident on board watercraft without accident to watercraft, not causing drowning and submersion, including: • accidental poisoning by gases or fumes on ship • atomic reactor malfunction in watercraft • crushed by falling object on ship • excessive heat in boiler room, engine room, evaporator room or fire room • explosion of boiler on steamship • fall from one level to another in watercraft • fall on stairs or ladders in watercraft • injuries in watercraft caused by machinery • localized fire on ship • machinery accident in watercraft
V94[b]	Other and unspecified water transport accidents, including: • accident to nonoccupant of watercraft • hit by boat while water-skiing
W16	Diving or jumping into water causing injury other than drowning or submersion including striking or hitting: • against bottom when jumping or diving into shallow water • wall or diving board of swimming-pool • water surface
W56	Contact with marine animal, including being bitten or struck by marine animal
W69	Drowning and submersion while in natural water including the open sea

Table 1. *(continued)*

ICD-10[a] code	ICD-10[a] description
W70	Drowning and submersion following fall into natural water
W74	Unspecified drowning and submersion including: • drowning (not otherwise specified) • fall into water (not otherwise specified)
W81	Diving with insufficient air supply
W94	Effects of air pressure from diving
X71	Intentional self-harm by drowning and submersion
X92	Assault by drowning and submersion

Notes: [a] International Statistical Classification of Diseases and Related Health Problems, tenth revision, 2016 version.
[b] Watercraft includes merchant ship, passenger ship (ferry-boat, liner), fishing boat, other powered watercraft (hovercraft on open water, jet skis), sailboat (yacht), canoe or kayak, inflatable craft (nonpowered), water-skis, other unpowered watercraft (surf-board, windsurfer), or other boat, ship or watercraft not otherwise specified.

A key deficiency in ICD-10 and the next revised version, ICD-11, is that classification and coding of the cause of deaths that occur in the sea are not easily distinguished from those occurring in other locations (WHO, 2017; 2019). A "place of occurrence" code in ICD-10, chapter XX enables the location where the external cause occurred to be identified; places, such as the home, school and street have specific codes. There is, however, no specific code for the sea; it is listed under the category of "other specified places" alongside other types of water bodies, such as lakes, pools, beaches and rivers, and unrelated places, such as desert and mountain. Notwithstanding the expanded list of external causes and dimensions of external causes under ICD-11, the sea is not specified as an extension code for the "type of place" and "part of a place" of occurrence, and only a few other water body types are specified under the category "countryside". Incomplete information on the place of death and the type of water body can obscure deaths specifically occurring in the sea in national statistics. This, in turn, can limit the ability of policymakers to address deaths occurring in the sea from deaths occurring elsewhere.

Furthermore, despite the ICD-10 standards, water-body-related deaths in Pacific island countries and territories are commonly classified as having occurred because of drowning. It is important to note that an individual may not have died from drowning as a consequence of an accident to a vessel. Other causes include natural diseases, trauma, air embolism, alcohol or substance use, heat exposure, hypothermia, intentional self-harm, and assault, which may have occurred either before entering the open sea, from falling or being thrown into the sea, or while in the sea, and that may have contributed or directly led to death. In this regard, drowning is a diagnosis of exclusion (Byard, 2015). Accordingly, it is crucial that the bodies of the deceased are carefully

examined by a qualified medical practitioner or forensic pathologist to rule out other conditions. Few Pacific island countries or territories have adequate and well-developed medico-legal coroner and medical examination systems, which is available in Fiji, to investigate the manner and cause of unexpected and unnatural deaths. As such, the cause of a death that occurs in the sea may be certified by a nurse, magistrate, police officer, registrar, or other persons who lack the requisite medical or forensic specialist training. Lack of qualified professionals is a key limitation to the appropriate certification of drowning and other water-related incidents in Pacific island countries and territories. Non-medically certified cause of death data can pose challenges in deriving reliable and accurate mortality statistics. Moreover, for deaths at sea that result from suicide, practitioners in the Pacific may be uncomfortable with making this diagnosis as the underlying cause of death because of the stigma associated with suicides and its legal implications. As a result, accidental deaths tend to be overrepresented.

In cases in which medical certification of the cause of death is not possible, verbal autopsy is considered an option for determining the probable cause of death. Verbal autopsy involves an interview with close relatives of the deceased using a questionnaire to collect information about signs, symptoms, demographic characteristics, and events in the period prior to the death (WHO, 2007). The questionnaire is then reviewed by a physician or, increasingly, through automated methods to ascertain the underlying cause of death (Murray and others, 2014). Verbal autopsy has not been used in Pacific island countries and territories, except in Papua New Guinea (Gouda and others, 2016) and more recently in Solomon Islands. Selecting appropriate respondents and eliciting information on the circumstances of a death at sea, of sufficient accuracy and specificity, present unique challenges in conducting a verbal autopsy to determine the cause. In particular, deaths at sea associated with accidents to vessels have multiple proximal and distal contributing causes that are human-, vessel-, and environment-related. Factors, such as human error in navigation, extreme weather conditions, overload, fuel loss, poor vessel design and operational and technical failures need to be considered and should be recorded for the purposes of accident prevention (Danielsson and others, 2010). The accuracy of statistics related to deaths occurring in the sea are dependent on the availability and quality of information on the circumstances of the death, manner of death, type of injury, and location. The recording and reporting of these data may be inconsistent and subject to recall bias if there is a delay in reporting the death.

While reliable mortality statistics on populations in Pacific island countries and territories who are at-risk at sea remains limited, increased attention has been placed on improving the registration of deaths and the quality of cause of death data in the region. The Brisbane Accord Group was established in 2010 to spearhead improvements in civil registration and vital statistics in the subregion (Brisbane Accord Group, 2015). In addition, the Ministerial Conference on Civil Registration and Vital Statistics, held in Bangkok from 24 to 28 November 2014, endorsed the Regional Action Framework on Civil Registration and Vital Statistics in Asia and the Pacific (ESCAP, 2014), which

contains two overarching goals to be achieved by 2024: universal civil registration of births, deaths and other vital events; and production and dissemination of accurate, complete and timely vital statistics (including on causes of death) based on registration records. Also of note, drowning prevention has become a regional priority (WHO, 2015). While mortality because of accidents in the sea is not a specific focus area of the Sustainable Development Goals (Pacific Community and Brisbane Accord Group, 2016), the subregion's physical geography and the current anecdotally estimated burden of morbidity and mortality highlights the need for appropriate measures to monitor and curb deaths from this cause.

IV. DATA AND METHODS

Case studies: Fiji, Kiribati and Tuvalu

A small-scale study was conducted to determine the scale of deaths at sea in Fiji, Kiribati and Tuvalu over the past 10 years. A secondary research objective was to assess deaths associated with small-scale vessels. These countries represent the three regions in the Pacific (Melanesia, Micronesia and Polynesia). Distinctive contextual characteristics affect the functioning of civil registration and vital statistics systems and the status of sea safety (table 2). Distinct characteristics are the high dependence on single outboard engines, the dispersion of multiple islands, and the low-lying topography of Kiribati and Tuvalu, which limits the visibility of the islands for seafarers. Furthermore, the countries were selected based on the following: reports of diving accidents related to sea cucumber fishing in Fiji; small-scale fishing vessel accidents in 2017 in Kiribati, and the notable success of the sea safety emergency grab bag initiative in Tuvalu (Figueroa, James and Blanc, 2018).

The civil registration and vital statistics systems of the three study countries are distinct in the level of completeness and dependency between the constituent data collections, predominantly the civil registration offices and the ministries of health. The civil registration and vital statistics system of Fiji is estimated to have high coverage and completeness of more than 95 per cent (Fiji Bureau of Statistics, Registrar General's Office and Ministry of Health and Medical Services, 2019). The Ministry of Health and Medical Services death reporting system is more complete than the civil registration system; however, there is strong dependency between them, with approximately 90 per cent of deaths recorded by the Ministry captured by the civil registration offices (Fiji Bureau of Statistics, Registrar General's Office and Ministry of Health and Medical Services, 2019). Completeness of death registration in Kiribati and Tuvalu is lower. Both countries have higher proportions of deaths assigned to ill-defined causes (table 2). Consolidation of mortality data sources is necessary. In Kiribati, the Ministry of Health and Medical Services and the Civil Registration Office are largely independent with

Table 2. Key country attributes

Attribute	Fiji	Kiribati	Tuvalu
Population (census year)	884 887 (2017)	110 136 (2015)	10 837 (2012)
Income group, level of development[a]	Upper-middle income	Lower-middle income, least developed country	Upper-middle income, least developed country
Completeness of death registration with cause-of-death[b]	96.2% (3.3% ill-defined causes) (2012-2017)[c]	75.0% (17.8% ill-defined causes) (Health Information Unit); 74.8% (Civil Registration Office) (2012-2014)[d]	61.5% (12.0% ill-defined causes) (2012-2016)[e]
Geography[f]	322 islands and atolls including two large and several medium-sized high islands	33 low-lying atolls and reef islands	Nine low-lying atolls and reef islands
Engagement in fishing activities[f]	52% of rural households in subsistence fishing	>90% of the population own boats	74% of households in reef fishing
Vessels for small-scale coastal fishing[g]	>1 500 mainly small outboard powered	>4 500 skiffs or canoes, outboard motor powered; and larger outboard-powered craft	512 outboard powered canoes or boats

Notes: [a] Income group is by World Bank classifications. The United Nations classifies Kiribati and Tuvalu as "least developed countries".

[b] Coverage is a measure of the percentage of the population within a geographical area that the civil registration and vital statistics system reaches. Completeness is the estimated percentage of deaths covered by the civil registration and vital statistics (CRVS) system that are registered with cause of death information within a specified time period (United Nations, 2014).

[c] *Source:* Fiji Bureau of Statistics, Registrar General's Office and Ministry of Health and Medical Services (2019)

[d] *Source:* Kiribati National Statistics Office, Civil Registration Office and Health Information Unit (2018). In Kiribati, the Health information Unit and Civil Registration Office sources are independent with no direct data sharing (Carter and others, 2012).

[e] *Source:* Tuvalu Central Statistics Division (2018).

[f] *Source:* Gillett (2016).

[g] *Source:* Welch (2016).

limited direct data sharing (Carter and others, 2012). In Tuvalu, the Ministry of Health reporting system is reportedly more complete than the system of the Civil Registration Office (Tuvalu Central Statistics Division, 2018).

Furthermore, these countries have different medico-legal death investigation systems. The system of Fiji is resourced with the magisterial service, police force and forensic pathologists to investigate the manner (accidents, suicides, homicides or undetermined) and cause of deaths that are unexpected, unnatural and suspicious, according to the Inquests Act of 1968 (Kalougivaki, 2015). By contrast, Tuvalu and Kiribati do not have these resources readily available; Australia and New Zealand can be called upon to assist with conducting autopsies, but it is only done on rare occasions and normally limited to cases involving assault because of the high costs.

For the present study, an analysis was conducted of the unit record death data provided by representatives of key agencies involved in death registration and the management of maritime accidents, namely the ministries of health, civil registration agencies, the police and fisheries departments. The data also included incidence reports published in media news sources, and grey literature, including Pacific Community reports, WHO reports, and government vital statistics and health reports.

Duplicate records of events at sea were identified between data sources using a combination of date of occurrence, age, sex, and cause of death where available to avoid double counting. In cases in which there were insufficient details to either match or separate two records, it was noted. The total numbers of reported deaths and accidents at sea, and the proportion of the total number of reported events that were captured by each source, were then calculated.

V. RESULTS

Between 2008 and 2017, 58 deaths at sea in Fiji, 81 deaths at sea in Kiribati, and seven deaths at sea in Tuvalu were identified from the data sources collated (table 3). The numbers fluctuated annually, reflecting variations in the frequency and severity of sea accidents. Based on these numbers, the average unadjusted mortality over the 2008-2017 period was 7.5 deaths per 100,000 in Kiribati and 17.6 per 100,000 in Tuvalu and 0.8 per 100,000 population in Fiji.

In Fiji, deaths at sea were identified from the collation of police accident reports and news sources. Police reports recorded 50 deaths, news sources reported 36 deaths; 28 deaths were recorded in both sources. Five deaths were also identified as being reported to the health facility based on news report details. Of annual drowning deaths, six out of 47 (13 per cent) in 2014, 14 out of 39 (36 per cent) in 2013 and 14 out of 75 (18.7 per cent) in 2012 occurred in the sea. Information was not available for other

Table 3. Reported deaths at sea in study countries, by age, sex, and source, 2008-2017

Variable	Fiji	Kiribati	Tuvalu
Age (years)[a]			
<10	5	18	..
10-29	5	5	..
30-49	7	4	..
>50	6	3	..
Unknown	35	51	..
Sex			
Men	24	34	7
Women	6	11	—
Unknown	28	36	—
Source[b]			
Police	50	14	..
News media	36	17	..
Health	..	35	7
Civil registry	..	17	7
Total	**58**	**81**	**7**

Notes: [a] Only six reported deaths in Tuvalu had data on age. Due to small numbers, age disaggregated data are not provided.

[b] Based on news sources, 13 reported deaths at sea in Fiji were related to small vessel activities. News sources also indicated five deaths at sea in Fiji being reported to the health facility. Information linking small-vessel activity to the deaths could not be ascertained from the other sources in all study countries. Data from the Ministry of Health and Civil Registration Office in Fiji were not available at the time of the study.

years. The Fiji Bureau of Statistics report drowning cases over the period 1998-2016, sourced from police crime statistics reports (Fiji Bureau of Statistics, 2017), however no information is given on drowning at sea. The available health reports and the World Health Organization Global Drowning report only includes data for “injury and other external causes” (Fiji, Ministry of Health and Medical Services, 2016a; 2016b; WHO, 2014). Thirteen deaths at sea in Fiji reported by news media sources were related to small vessel activities.

In Kiribati, deaths at sea were identified from the collation of records of the Civil Registration Office, Ministry of Health and Medical Services records, police accident reports, and news sources. Reporting of deaths at sea through the health system was higher and more detailed than the reporting from the Civil Registration Office: 35 deaths

(43 per cent) versus 17 deaths (21 per cent). No death records were shared between the two institutions. Police records indicate 14 deaths (17 per cent), none of which are recorded in the Civil Registration Office or the Ministry of Health data. News sources report 17 deaths (21 per cent), of which two (2.5 per cent) are recorded by the Civil Registration Office or in the Ministry of Health and Medical Services data. Eight deaths could not be reconciled with the Civil Registration Office or the Ministry of Health and Medical services because of insufficient information. All 17 deaths registered with the Civil Registration Office are recorded as "lost at sea". In the Ministry of Health and Medical Services dataset, the causes of the deaths are drowning in 33 deaths (40.7 per cent), "lost at sea" in one death (1.23 per cent), and "diving-related" in one death. The most recent Health Bulletin (2015) attributes four deaths to "accidental drowning and submersion" (three males, one female) and three deaths to "unspecified drowning and submersion"; no information is specific to drowning in the sea (Kiribati, Ministry of Health and Medical Services, 2016). No statistics on drownings or deaths at sea have been found in other annual health reports. No sources included in the study have provided data on deaths related to small-scale vessels.

In Tuvalu, between 2008 and 2017, seven deaths at sea were recorded in the Civil Registration Office and Ministry of Health records; the Civil Registration Office and Ministry of Health records showed the same six deaths at sea, though the information provided by the Civil Registration Office was more comprehensive than that from the Ministry of Health. In the combined Civil Registration Office-Ministry of Health dataset, the causes are documented as drowning, one of whom was missing at sea and presumed drowned. All the deaths were males. None of the records from the police maritime unit or available news sources report any deaths at sea. The central statistics division has only published statistics on the leading causes of mortality from 1997 to 2007, and notably, these statistics do not feature drowning or deaths at sea. No sources included in the study provide data on deaths related to small-scale vessels.

VI. DISCUSSION

Data on deaths at sea in the three study countries are fragmented among multiple sources. The majority of reported deaths include no information on age. Data on small vessels involvement is also limited. These factors hamper measurement of the true burden of all at-sea mortality and limit inferences about risk groups.

In previous research, Murray and Carter (2017) developed a model to investigate the association of meteorological factors and holiday periods on monthly fatal drowning cases in Fiji between 2012 and 2015. The model included police and health records, and data from the Fiji Meteorological Services and the Bureau of Meteorology in Australia. Murray and Carter (2017) estimate that 187 drowning deaths (6.3 per 100 000 population) occurred yearly with 28 per cent in the sea; 135 cases (72 per cent) were

less than 35 years and 137 cases (73 per cent) were male. The disproportionately higher mortality in males found in the present study corroborates this research, although data on sex are missing in many cases in the present study. The present study is intended to ascertain the number of deaths reported by available sources, such as the Fiji Police Force reports and news media, rather than the number of deaths that are estimated to occur over time.

Regarding deaths at sea in Kiribati, the results show that reporting through the health system is more complete and comprehensive than to the Civil Registration Office. However, as death certificates are not issued in the majority of deaths in the country, the available data on causes of death are likely to be underrepresented and not accurately reflect specific underlying causes (Kiribati, Ministry of Health and Medical Services, 2016; Brisbane Accord Group, 2015). Moreover, contrary to other Pacific island countries and territories, deaths at sea reported through the Civil Registration Office are not reported in the Ministry of Health and Medical Services. The absent overlap in death records between the Civil Registration Office and the Ministry of Health and Medical Services in Kiribati was highlighted by Carter and others (2012). In Tuvalu, the information provided by the Civil Registration Office is more comprehensive than that from the Ministry of Health. Death registration is conducted at the local council level and collated at the national level (Brisbane Accord Group, 2015). Available published secondary information or news sources on mortality data are limited.

It is difficult to make a valid comparison between the three study countries. While data were not available from the health and civil registry departments for Fiji at the time of the study, a lot more data were available from police and maritime reports and informal data sources compared to Kiribati and Tuvalu. It is worth noting, however, that the mortality burden is higher in Kiribati and Tuvalu at the population level than in Fiji. This indicates that accidents at sea in small island populations can have a considerable impact compared to accidents in larger island populations. It highlights the importance of ensuring sustainable programme support for small island populations.

The paucity of death data related to small vessels across all study countries highlights a number of issues. Cause of death information is generally reported by the next of kin or a family member who may not know all the correct circumstances of the death, may consider the information sensitive, or may inadvertently provide the wrong information. Certifiers may only record the consequences of the injury or only the mode of dying (such as drowning) with no additional information on the external cause and circumstances leading to death. This affects the accuracy of mortality coding, and coders may not know how to identify additional information to assign an appropriate underlying cause of death. Another contributor is the lack of data sharing and synchronization of data systems among the police, the coroners' court, and the mortality coders, coupled with a lack of clear guidelines for such activities.

National legislation (specifically the Births, Deaths and Marriages Registration (Amendment) Act 2014 of Fiji, the Births, Deaths and Marriages Registration (Amendment) Act 2007 of Kiribati, and the Births, Deaths and Marriages Registration Act 2008 of Tuvalu),[5] states that all deaths and their cause must be registered. A death certificate should be completed by a medical practitioner or other authorized person adhering to the WHO ICD-10 guidelines to ascertain the cause of death, and forwarded to the registrar. The legislations state that deaths that occur outside of the home are to be reported to the police, and any particulars concerning the death or findings of specific inquests into deaths are to be forwarded to the registrar. The Births, Deaths and Marriages Registration (Amendment) Act 2014 in Fiji makes a separate stipulation for deaths that occur on board a vessel at sea by requiring that they be reported to a chief customs officer who then will forward the information to the registrar. Also of note, anyone who fails to notify a death resulting from an accident may face penalties, including fees or imprisonment, in accordance with legislation, such as the Death and Fire Inquiries Ordinance 2008 of Kiribati, and the Death and Fire Inquiries Act 2008 of Tuvalu (Pacific Islands Legal Information Institute, 2019). In practice, the enforcement of this legislation is weak and there are no systematic responsibilities, obligations, or procedures in place for recording and compiling deaths that occur in the sea. Furthermore, under the Maritime Fiji Small Craft Code (2014) and the Pacific Maritime Legislation and Regulations (PIMLaws) (Secretariat of the Pacific Community, 2002), all accidents at sea must be recorded in the vessel log book and reported to an authority as soon as practicably possible. In this regard, provisions for small-scale fisheries remain insufficient in the countries' fisheries acts, while the shipping acts apply to large-scale vessels only.

To enhance the capacity of civil registration and vital statistics systems in capturing deaths at sea, legislation should have clear provisions that set out the following: the roles and responsibilities of provincial registrars; penalties and incentives linked to the reporting of deaths to government agencies within strict timeframes; collection of fundamental information for each death; and obligations of government agencies to share reports and data with national statistics offices (Pacific Community, 2016). There is also need to clearly describe collaborations among agencies and the coordination of their functions within the civil registration and vital statistics system. This includes delineating the needs and services among agencies requiring death registration data for legal purposes; for compiling statistics; for planning, implementing and evaluating public health programmes; and for other administrative purposes.

[5] Copies of the legislation are available at www.paclii.org/index.shtml.

Limitations of the data sources

The results of this research are limited by gaps in the data sources and underreporting of events. As a result, the scale of deaths at sea is expected to be underestimated. As more data were available for some years (later in the 2008-2017 period), an assessment of mortality trends over the time period cannot be made. The ICD-10 coding system underestimates deaths at sea, as drowning deaths related to water transport, intentional cause, or other causes are coded to different cause categories (table 1). Including these causes could increase the true burden of all drowning mortality by 30 to 50 per cent (WHO, 2014). Data on non-fatal drownings are not routinely collected, thereby masking the burden of serious injury (WHO, 2014). Information on age was also limited in the data collated, hindering inferences about risk groups in deaths and accidents. In the present study, only online services in English are reviewed; any accidents reported in local newspapers or online reports in the local language are missed. It is also possible that individuals who were reported missing were subsequently found and an update of this was overlooked. A quality assessment of the data collated from all formal and informal sources needs to be carried out. Despite these limitations, this is the first attempt, to the authors' knowledge, to bring together mortality data from multiple data sources to assess the scale and registration of deaths at sea in selected Pacific island countries and territories. The study serves as the basis for which further studies linked to civil registration and vital statistics systems can be conducted. For example, extended field work and interviews with local fishers, their families and community organizations would likely strengthen the current findings. Such qualitative data would also help to identify socioeconomic incentives or disincentives for fishers and their families to report deaths and accidents at sea.

VII. CONCLUSION AND RECOMMENDATIONS

Data on deaths and accidents at sea in Fiji, Kiribati and Tuvalu are fragmented among multiple sources. There is a critical need to improve the recording, management, sharing and use of these data across government sectors, particularly among civil registration and vital statistics stakeholders to enhance understanding of the scale of deaths at sea in Pacific island countries and territories. In addition, the production of accurate and reliable statistics on deaths, accidents and their causes are crucial to inform the planning, implementation and monitoring of sea safety regulations, and strengthen the value and cost-savings of complementary sea safety initiatives in the Pacific island subregion (Figueroa, James and Blanc, 2018).

As with many international public health challenges, a multi-sectoral holistic approach and political commitment from all stakeholders is necessary. Evidently, strengthening sea safety programmes requires concomitant strengthening of civil registration and vital statistics systems. It is important to ensure sufficient and quality

information is collected and used effectively in resource-limited Pacific island countries and territories. It is equally important to address socioeconomic barriers among community members to report accidents that occur in the sea and register any deaths. Incentives and targeted community advocacy could help establish an enabling environment for this.

Below are recommendations for strengthening civil registration and vital statistics systems to more effectively capture deaths that occur in the sea:

(a) Standardize regular collection and recording of comprehensive data on death and causes of death; and accessibility and utility of the data.

(b) Consider revising the nomenclature of the fourth character codes in ICD-10 and ICD-11 to distinguish water body-related deaths.

(c) Standardize and formalize roles and responsibilities for routine data collections on deaths at sea among civil registry, health, police, and maritime departments, medical-legal authorities, and statistics offices to harmonize the data.

(d) Educate and motivate fisheries management, small vessel operators, families of the deceased, and community members about the importance of reporting deaths resulting from accidents at sea.

(e) Establish standard streamlined procedures for reporting accidents at sea and recording the circumstances surrounding the event.

The development and implementation of an injury surveillance system, using the WHO Injury Surveillance Guidelines (Holder and others, 2001) may facilitate the efficient collection of reliable epidemiological data and detailed cause of death data useful for population-level interventions to prevent deaths occurring in sea, while maintaining compliance with ICD-10. The Fiji Injury Surveillance in Hospitals system (Wainiqolo and others, 2013) offers a potential model for other Pacific islands. The system was implemented in urban and rural hospitals in the main island of Fiji. It uses a form to capture data from medical records, including demographic information, injury circumstances and consequences (place of occurrence, activity, cause, intent, nature of the principal injury, length of stay, and status at discharge), and record information on other contributing risks, such as substance use. While there is no explicit target for reducing mortality at sea in the 2030 Agenda for Sustainable Development, improved data on deaths occurring in the sea is important for improving mortality statistics and contributing to health and development progress in the subregion.

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ASIA-PACIFIC SUSTAINABLE DEVELOPMENT JOURNAL
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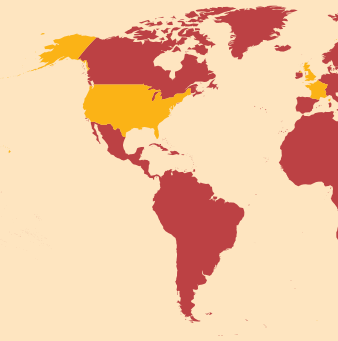

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