

## **An Investigation of the Determinants of Household Vulnerability and Poverty in Korea\***

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The present study investigates the determinants of household poverty, and *ex ante* vulnerability as expected poverty. We also examine the role of household vulnerability on poverty dynamics during 2012-2013. Our empirical findings suggest that (i) although overlapping in the determinants between those two deprivations, some household characteristics such as higher debt burden are prone to not current poverty but future poverty and (ii) Not only does vulnerability translate into poverty, but also tends to create poverty trap. An accurate identification of vulnerability and an elaborate design of public safety nets are necessary for durable poverty reduction and prevention.

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## 1. INTRODUCTION

Driven by the fact that the living standards of households highly fluctuate due to a variety of risks or the exposure to the risks, literature has shed new light on the study of household vulnerability. However, such negative shocks on household income and consumption do not necessarily result in household poverty. This is because, to some extent, households can not only prevent those risks in an *ex ante*, but can also reduce the effect of (downside) shocks by mitigating and coping the negative consequences *ex post*. Putting another way, although risks are not always the main cause of household poverty, if household resilience or the choice of preventative and protective instruments are constrained, then it would make households vulnerable to poverty. Hence, the study of vulnerability conceptually differs from the study of poverty: The former emphasizes uncertain outcome given risky environment whilst the latter focuses on the known outcome by data collected in the past. Although poverty assessment — both static and dynamic — has become popular in Korea, vulnerability assessment is rarely undertaken despite the frequent usage of ‘vulnerable class’ in poverty literature.

In particular, despite that vulnerability is a risk specific concept as stated above, ‘the vulnerable’ in Korea is simply defined by demographic characteristics such as the elderly, female, the disable or children etc. However, whether or not they are vulnerable is a empirical question and needs supporting evidence.<sup>1)</sup> Besides, considering that vulnerability is a similar but distinct concept with poverty, it is another empirical question whether factors influencing on those two particular kinds of human deprivations are similar or not. Vulnerability is forward-looking and risk/hazard-specific whereas poverty is an *ex post* outcome of human well-being caused by transient (e.g., risk events such as economic shocks) or

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<sup>1)</sup> In fact, Kang (2014), estimating household vulnerability, shows that those — the elderly and female headed households etc. are more vulnerable than their counterparts, the young and male headed households. A brief summary of findings is given below. Also please see Kang (2014) for more details.

structural factors such as discrimination in labor market. If the determinants of poverty and vulnerability are similar, then the anti-poverty interventions would take effects for both reducing and preventing poverty. However, if they are different each other, relying on the information from conventional poverty analysis with respect to the currently poor will bring insufficient policy implications because there are the vulnerable non-poor who is usually invisible from poverty analysis but is likely to fall into poverty given uncertain future. Therefore, to analyze the determining factors of poverty and vulnerability is essential for the design of effective poverty policy.

With this in mind, modifying and extending Kang (2014) that estimated Korean household vulnerability, the present study aims to make a contribution to vulnerability assessment in Korea (i) by investigating whether or not there is any difference in the determinants of poverty and vulnerability, and (ii) by testing if *ex ante* vulnerability translates into *ex post* poverty,<sup>2)</sup> and (iii) by examining the role of in vulnerability in household poverty dynamics — the shift in household poverty status. To address these research objectives,<sup>3)</sup> the remainder of the paper is organized as follows. The second and the thirds section offer a couple of findings from poverty literature and description of data used in the present study. Section 4 discusses the econometric methodology and section 5 presents the results. The final section provide summary.

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<sup>2)</sup> Literature emphasizes the role of vulnerability on household poverty but there is little empirical approach undertaken to the conceptual linkage. Amongst, please see Imai, Gaiha, and Kang (2011) who test the vulnerability-poverty linkage using Vietnamese household surveys. The present study follows their approach.

<sup>3)</sup> Following the strategies adopted in Imai, Gaiha, and Kang (2011) analyzing Vietnam's poverty and vulnerability, the present study assess the determinants of vulnerability as well as poverty and examine the role of vulnerability on household poverty dynamics with Korea recent SFLC dataset. Given the rising concern with respect to Korean household debt burden which calls for policy priority recently, the present study examines how household debt burden proxied by debt to income service influenced on household poverty and vulnerability, which was not examined in Imai, Gaiha, and Kang (2011). As we will see in section 5, higher debt burden is prone to vulnerability but not to poverty.

## 2. LITRATURE REVIEW<sup>4)</sup>

In Korea, a growing body of research has analyzed household poverty since 1997 Asian Currency Crisis. For example, Seok (2007) analyses the persistence of income poverty from 1998 to 2005 and finds the existence of state dependence where a household experienced poverty in one period is more likely to experience it in one of following periods. The sizable effect of state dependence implies public anti-poverty interventions might be effective not only on poverty alleviation but also on poverty prevention. Sung (2007) shows that decline in income mobility over the period of 1999-2004 led to the extended duration of household poverty. Given the observed poverty persistence and the estimated size of public expenditure to life the poor out of poverty, he suggests the differentiated supports for the transient poor and for the chronic poor in order to reduce the government budget for anti-poverty programs. Drawing upon more recent data covering the period 2005-2011, Lee (2013) also observes similar patterns. The common finding of these studies exploring the dynamic nature of poverty is that the share of the transient poor among the poor is sizable whilst certain groups suffer from chronic poverty. The fact that many Korean households frequently moved in and out of poverty implies that the living standards of Korean households fluctuate to a great extent and therefore even currently non-poor households might be vulnerable to poverty facing unexpected risks. Yoo (2008) investigates progress in the change of poverty headcount ratio from 1982 to 2007 and shows that while sharp poverty reduction had sustained until 1992, it almost stagnated. He concludes that the worsened income distribution since 1993 offset poverty reducing effect of economic growth, though sluggish, while the remarkable progress in poverty alleviation during the first ten years was attributed to both high economic growth and pro-poor income distribution (Yoo, 2008). Literature also suggests similar patterns in the determining factors of household poverty that households headed by female, the old, the less educated or households with irregular

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<sup>4)</sup> This section is largely draws upon Kang (2014).

income source are more associated with poverty (Kim, 2004; Seok, 2007; Kang, 2009).

Contrasted to a surge of interests on poverty assessment, the analysis of vulnerability has drawn relatively less attention from academic and policy studies in Korea. Amongst, Goh, Kang, and Sawada (2005) look into household vulnerability *ex post* by examining household response to economic crisis in 1997. The main findings are as follows: (1) Although credit contributed household consumption smoothing before the crisis, it was ineffective during the crisis due to credit crunch. In contrast, (2) private transfer performed as instruments for both preventing income risks *ex ante* and coping the adverse shocks *ex post*. They suggest therefore that when government designs public transfer program, it needs to prevent crowding out private transfer (Goh, Kang, and Sawada, 2005). On the other hand, Kang and Sawada (2009) examine the effect of public transfers, carefully controlling endogeneity bias, and observe that formal public transfers program, not available during the initial phase of the 1997 crisis, could have played a vital role as a household risk coping device against the adverse shocks even though it became effective after crisis. An important policy implication of these studies<sup>5)</sup> might be that while keeping the crowding-out effect minimized, the government also needs to elaborate effective public safety nets programs with the continuous efforts in order to reduce household vulnerability against future shocks. Bourguignon, Goh, and Kim (2006) construct the measure of vulnerability to poverty based on pseudo panel data on the assumption that there is no available lengthy household panel data. On the other hand, Kim and Min (2011) estimate household vulnerability during 2001-2008 using a method proposed by Ligon and Schechter (2003) where vulnerability as low expected utility (VEU) is defined as the difference between the utility derived from the level of certainty equivalent consumption, often poverty line, and the expected utility derived from

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<sup>5)</sup> Note that Goh, Kang, and Sawada (2005) and Kang and Sawada (2009) do not quantify the level of household vulnerability directly. Instead, they focus on, and nicely analyze how Korean households, who experienced high vulnerability facing such unprecedented risk, coped with the negative shock.

household consumption. Their estimate, which is 0.245, implies that Korean households have experienced approximately 24.5% of loss in their utility due to structural factors such as poverty or inequality and transitory factors such as risks — The shares of the structural and the transitory factors to total vulnerability were estimated to 67% (poverty component) and 33% (risk component). More recently, Kang (2014) estimate Korean household vulnerability as expected poverty (VEP), i.e., *ex ante* probability that households will fall into or stay in poverty in the future, by the method proposed by Chaudhuri, Jalan, and Suryahadi (2002). It is widely applied method in vulnerability literature (e.g., Chaudhuri, Jalan, and Suryahadi, 2002; Jha and Dang, 2009; Imai, Gaiha, and Kang, 2011 for academic literature and Deressa, Hassan, and Ringler, 2009; Albert, 2007 for policy literature).<sup>6)</sup>

The followings are a brief summary of key findings from Kang (2014).

- Female headed households show on average both high poverty incidence and vulnerability, i.e., 39.8% of poverty ratio and 37.8% of probability of falling into poverty in the near future whilst its counterpart, male headed households, recorded both lower poverty ratio and lower vulnerability, 15.5% and 9.9% respectively.
- Although the elderly groups aged above 60 appear to be poorer and more vulnerable, disaggregating the group into who aged between 60-69 and who

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<sup>6)</sup> The VEP has several advantages: (i) it has a less data constraint as it can be applied with a single cross-sectional data based on some statistical assumptions. (ii) it is more suitable in anti-poverty intervention perspective as it estimates *ex ante* probability that a household will stay or fall into poverty in the future. Moreover, (iii) it enables us to explore the linkage between chronic poverty and vulnerability where two broad approaches to chronic poverty — the spells approach focusing on poverty transition (Gaiha and Deolalikar, 1993) and the component approach distinguishing permanent component of income from fluctuating components (Jalan and Ravallion, 2001), do not incorporate vulnerability (McCulloch and Calandrino, 2003; Barrientos, 2013). However, it also has a couple of shortcomings — it does neither properly take account of household risk attitudes (e.g., see Hoddinott and Quisumbing, 2008) that can be overcome by the measure of VEU, nor reflect consumption shortfalls by downside risks. The third popular measure of vulnerability defines vulnerability as uninsured exposure to risk (VER). It can offer an implication on whether the existing mechanism of risk management does effectively protect households from negative shocks. However, it is an *ex post* measure while VEP and VEU measures are *ex ante* measure of vulnerability.

aged above 70 suggests substantial difference: (i) For the former, vulnerability is significantly lower than poverty ratio (14.4% vs. 24.3%). In particular, higher vulnerability of poor households in this group implies that they were likely to be trapped in poverty whereas the non-poor household enjoyed lower vulnerability. In contrast, (ii) For the latter, those who aged above 70, shows extremely higher poverty incidence and higher probability of future poverty regardless of poverty status (i.e., whether they were poor or not in sample periods).

The limitation of the those studies with respect to Korean household vulnerability in terms of policy perspective is that it does not tell us factors influencing on household poverty and vulnerability, which will be deliver important information in the design of effective anti-public interventions. Besides, it is empirically unclear whether vulnerability will increase poverty *ex post*.

### 3. DATA<sup>7)</sup>

The present study draws upon the survey of household finances and living conditions (SFLC) 2012 and 2013. Designed to be a national representative household survey, the SFLC was first collected in 2012 by the statistics Korea (KOSTAT), Financial Supervisory Service (FSS) and Bank of Korea, and is carried out in annual basis. It consists of two components: Finance component collects information on about 150 items including household composition, assets and management plan of financial assets, household debt and ability to repayment, income and plan for aging etc. Welfare component collects information about 150 items including household composition, detailed consumption expenditure for both, food and non-food items, economic activity such as labor market participation, health etc.

The total sample size for common items is 20,000 households of which 10,000 households were surveyed more focusing on financial status and

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<sup>7)</sup> This section largely draws upon Kang (2014).

another 10,000 households were interviewed more focusing on welfare status. The final sample sizes for the present study are 9,554 households in 2012 and 8,983 households in 2013 (both from welfare component) due to missing observations. Two major data widely used in the analysis of poverty in South Korea are Korea labor and income panel study (KLIPS) and Korea Welfare Panel Study (KOWEPS). Although time series of the SFLC is shorter than the other two surveys, it has advantages in sample size and representativeness as well as relative scarcity in poverty assessment. Besides, being planned to be a long panel survey for the analysis of household financial and welfare status, the findings from the first two rounds of the SFLC are expected to offer useful information for following studies.

Table 1 and 2 show household characteristics attributable to sample household sorted into deciles using per adult equivalent consumption expenditure in 2013 and sample mean of key explanatory variables including vulnerability estimates used in the present study according to their poverty status between 2012 and 2013.

The higher consumption expenditure, the lower age of household head, the lower share of female headed household and the lower dependency ratio are observed. The elderly and female headed households are more likely associated with the lack of access to labor market or unstable employment due to structural factors such as low labor productivity or discrimination. Lower consumption expenditure in these groups might be attributed to lower income generating capacity. The size of monthly income of public transfer shows U-type pattern: It was the lowest in the fifth decile households and both the poorest and richest groups received almost same amount of public transfer. However, such a pattern was not found from income of private transfer: the poorer (the richer) households, the higher (the lower) amount of private transfer was received.<sup>8)</sup>

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<sup>8)</sup> It is interesting that the poor and the rich households received same amount of public transfer. It is presumed that the former group is more assisted by social security benefit while the latter more receives pension. Unfortunately, since disaggregated records for 8 specific items of public transfer were not given for the present study, we could not further explore the contribution of each item to total public transfer by decile.



**Table 1 Per Adult Equivalent Household Annual Consumption Expenditure Deciles**

(units: Korea Won, %)

Decile	Consumption Expenditure	Average Age of Household Head	Share of Female Headed Households	Dependency Burden	Disposable Income
1	335.6	69.6	54	64.4	596.6
2	564.7	60.6	42.3	49.6	908.2
3	748.7	55.1	28.9	34.9	1,337.20
4	916.5	51	24.3	30.2	1,587.60
5	1,080.90	48.9	20.9	27.6	1,795.10
6	1,249.60	47.5	16.9	26.7	2,050.20
7	1,442.10	47.9	11.7	27.3	2,291.00
8	1,679.10	48.1	10	28.3	2,768.40
9	2,034.60	48.7	8.8	29	3,136.50
10	3,093.70	49.7	8.6	34.5	4,578.60
Decile	Income (Public Transfer)	Income (Private Transfer)	Asset	Debt	Saving
1	244.1	151.9	7,286.30	667.1	885.9
2	265.5	160.4	11,907.90	1,537.80	1,620.70
3	233.1	120.9	16,755.80	2,274.70	2,822.20
4	199.5	96.3	20,939.40	4,052.30	3,598.40
5	167.9	70.7	23,588.90	4,126.30	4,712.80
6	169.5	60.8	25,847.10	4,537.30	5,177.80
7	221.3	56.9	30,834.70	5,791.20	5,977.90
8	219.2	67.1	40,745.80	7,102.40	7,955.40
9	218.2	40.4	50,476.40	8,850.70	10,798.80
10	238.4	66.9	98,512.40	16,411.10	21,328.80

Source: Kang (2014).

As shown from table 2, the most vulnerable group is those who are chronically poor and their estimated vulnerability ranges from 42% to 76%, i.e., with the probability from 42% to 76%, they are likely to stay in poverty in the future. The transient poor whether or not they fell into or escaped from poverty in 2013 has a probability of expected poverty around 28% whilst the chronically non-poor has only 6% of probability based on 100% poverty line.

**Table 2 Sample Mean of Key Variables according to Poverty Status between 2012 and 2013**

Poverty Status between 2012 and 2013 Variable	Those who escaped from poverty in 2013		Those who fell into poverty in 2013		Those who were poor in both years		Those who were never poor	
	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean
VEP100	522	0.288	666	0.279	1,152	0.608	6,399	0.060
VEP80	522	0.150	666	0.131	1,152	0.416	6,399	0.023
VEP120	522	0.434	666	0.444	1,152	0.764	6,399	0.125
Female Head (1 if household head is female)	522	0.324	666	0.344	1,152	0.484	6,399	0.157
Age (age of household head)	522	58.289	666	58.411	1,152	68.249	6,399	49.586
Having a Spouse (1 if household head has a spouse)	522	0.594	666	0.590	1,152	0.444	6,399	0.769
Dependency Burden	522	0.416	666	0.438	1,152	0.623	6,399	0.298
No School (1 if household head has not completed primary school)	522	0.105	666	0.131	1,152	0.339	6,399	0.019
Primary School (1 if household head has completed primary school)	522	0.228	666	0.230	1,152	0.286	6,399	0.069
Middle School (1 if household head has completed middle school)	522	0.167	666	0.159	1,152	0.150	6,399	0.096
High School (1 if household head has completed high school)	522	0.337	666	0.324	1,152	0.163	6,399	0.361
College (1 if household head has completed college)	522	0.052	666	0.059	1,152	0.019	6,399	0.113
University (1 if household head has completed university)	522	0.098	666	0.087	1,152	0.035	6,399	0.278
Master and Above (1 if household head has completed master or above)	522	0.013	666	0.011	1,152	0.008	6,399	0.065

Regular Employment (1 if household head Has regular job position)	522	0.222	666	0.215	1,152	0.062	6,399	0.492
Irregular Employment (1 if household head has irregular job position)	522	0.192	666	0.215	1,152	0.174	6,399	0.116
Self Employed with Hiring (1 if household head is self-employed hiring others)	522	0.015	666	0.006	1,152	0.001	6,399	0.073
Self Employed without Hiring (1 if household head is self-employed without hiring others)	522	0.249	666	0.231	1,152	0.175	6,399	0.194
Merit Employment (1 if household head has merit based job position)	522	0.008	666	0.006	1,152	0.005	6,399	0.016
No Employment (1 if household head has no job)	522	0.314	666	0.327	1,152	0.582	6,399	0.109
Log Net Asset (log of net asset)	513	8.797	647	8.732	1,136	7.762	6,300	9.765
Log DTI (log of debt to income service)	522	1.519	666	2.035	1,152	0.501	6,399	1.322

Note: VEP100, VEP80 and VEP120 are the estimates of household vulnerability based on 100%, 80%, and 120% of official poverty line.

Source: SFLC (2013).

#### 4. ECONOMETRIC METHODOLOGY

Before moving into the models of our econometric analyses, we briefly introduce how we constructed the measure of VEP in Kang (2014) here.

The *ex ante* measure of vulnerability as an expected poverty can be specified as follows:

$$V_{it} = \Pr (c_{i,t+1} \leq z), \quad (1)$$

where vulnerability of household  $i$  at time  $t$  is defined as a probability that the level of household  $i$ 's consumption at time  $t+1$ ,  $c_{i,t+1}$ , will be below the poverty line,  $z$ .

Given a single cross-sectional household survey, the stochastic process generating the consumption of household  $i$  is assumed to take the following function.

$$\ln c_i = X_i \lambda + \varepsilon_i, \quad (2)$$

where  $\ln c_i$  is log of real household monthly consumption expenditure for household  $i$  and  $X_i$  is a vector of observable household characteristic and other determinants of household consumption. It is assumed in equation (2) that the structure of the economy is relatively stable over time and future consumption stems from the uncertainty about the idiosyncratic shocks and unobservable characteristics, captured by  $\varepsilon_i$  which contribute to different level of household consumption.

Hence, the variance of the disturbance term is assumed to depend on:

$$\sigma_{\varepsilon_i}^2 = X_i \vartheta. \quad (3)$$

The consistent and asymptotically efficient estimates of  $\lambda$  and  $\vartheta$  are obtained using the three-step feasible generalized least square (FGLS) method.<sup>9)</sup> Using the FGLS estimates  $\hat{\lambda}$  and  $\hat{\vartheta}$ , we can compute the expected household log consumption and the variance of log consumption for each household as follows:

$$\hat{E} [\ln c_i | X_i] = X_i \hat{\lambda}, \quad (4)$$

$$\hat{V} [\ln c_i | X_i] = X_i \hat{\vartheta}. \quad (5)$$

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<sup>9)</sup> Please see Chaudhuri, Jalan, and Suryahadi (2002) for technical details.

By assuming  $\ln c_i$  is normally distributed and using the estimates above, household vulnerability, i.e., the estimated probability that the currently non-poor household will fall into or the currently poor household will stay in poverty in the future, is expressed as follows:<sup>10)</sup>

$$\hat{V}_i = \hat{\Pr}(\ln c_i < \ln z | X_i) = \Phi\left(\frac{\ln z - X_i \hat{\lambda}}{\sqrt{X_i \hat{\sigma}}}\right), \quad (6)$$

where  $\Phi$  denote the cumulative density function of the standard normal distribution.

Equation (6) implies that the currently poor household would have no hope to escape from poverty if its expected consumption is below poverty and has little variance.

The estimates of household vulnerability in Kang (2014) obtained from the procedure described above are used in the present study as follow:

#### 4.1. Model (a): Determinants of Poverty

Vulnerability is closely related to but distinct from poverty, and literature conceptually argues a linkage between vulnerability and poverty. However, little has empirically examined it. In this section, we test the effect of household vulnerability in 2012 on household poverty status in 2013, following Imai, Gaiha, and Kang (2011). Note that whilst we examine in the last section the role of vulnerability on household poverty dynamics (i.e., the change in household poverty status over time) utilizing our panel data, we use the conventional probit estimation is applied in this section as a snapshot of household welfare given the research objectives of the present study. So we can test (i) whether there is any difference in the determining factors of those similar but distinct deprivations — poverty and vulnerability and (ii)

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<sup>10)</sup> The estimates of household vulnerability in Kang (2014) obtained from the procedure described above are used in the present study as follow.

whether *ex ante* vulnerability will translate into *ex post* household poverty.

With this in mind, we assess the determinants of poverty using a probit model, i.e., whether the monthly household consumption expenditure is above the poverty line or not, conditioned on a set of household characteristics ( $X_i$ ) which includes age of the household head and its square, gender of household head, whether a household has a spouse, the educational attainment of household head, dependency burden, employment status of a household head, log of household net asset and its square, household debt to service ratio and its square. Our specification follows the standard models of consumer behavior where the variables such as the age of household head, dependence burden, household net asset, etc. partly capture permanent income hypothesis or life cycle models and the variables such as the gender of household head and whether a household has a spouse reflect intrahousehold-bargaining model (Deaton, 1992). Formally,

$$\Pr(P_i = 1) = \Phi(X_i\beta'), \quad (7)$$

where  $P_i = 1$  if  $c_i < z$  and  $P_i = 0$  otherwise.  $\Phi(\bullet)$  represents the cumulative density function of the standard normal distribution.

$P_i$ ,  $c_i$ , and  $z$  denote household poverty status (i.e., poor or non-poor), household monthly consumption expenditure and poverty line of monthly minimum expenditure.

We can explore the association between *ex ante* household vulnerability and *ex post* poverty by adding the vulnerability estimate as one of the arguments in the estimation of poverty with 2013 data. The poverty line is an arbitrary threshold identifying household status and the result is sensitive to the choice of the poverty line, we also use two different kinds of poverty — 80% and 120% of the minimum consumption expenditure for sensitivity tests.

#### 4.2. Model (b): Determinants of Vulnerability

Turning into the determinants of vulnerability, the following model is

estimated using the ordinary least square where vulnerability estimate is regressed on household characteristics to identify the determining factors of household vulnerability.

$$\hat{V}_i = X_i\psi + e_i. \quad (8)$$

We use the estimates of household vulnerability as dependent variables constructed by three poverty lines (100%, 80%, and 120%).

Thus, the results from models (a) and (b) will allow us to see whether there is any difference in the determinants of poverty and vulnerability, which might offer important policy implications for both poverty reduction and prevention.<sup>11)</sup>

#### 4.3. Model (c): Role of Vulnerability on Poverty Dynamics

Further extending the determinants of poverty in model (a), we examine the role of vulnerability on household poverty shift over 2012-2013 using a multinomial logit model.<sup>12)</sup> It is the most widely used approach to poverty dynamic literature examining the movement of household poverty status during a certain period of time (e.g., those who always poor; those who fell into poverty; those who escaped from poverty; those who always non-poor) and allows us to identify more prevalent household characteristics within each category (McCulloch and Baulch, 1999).

The main hypotheses to be tested are how vulnerability influenced on (i) the probability of the non-poor who slipped into poverty in 2013 and (ii) the

<sup>11)</sup> Also please see Imai, Gaiha, and Kang (2011).

<sup>12)</sup> It might be argued that it two rounds of panel data bring insufficient information for discussion of long term poverty dynamics. Admitting this argument as being reasonable, the present study synonymously treats the shift of household poverty status as poverty dynamics following the poverty literature (e.g., McCulloch and Calandrino, 2003). Besides, as shown from table 2, while the transitorily poor — those who escaped from poverty and those who fell into poverty — show similar estimates of vulnerability (approximately 28%), the chronically poor have on average 61% of probability of staying in poverty. The much higher probability found from the latter might imply that they are trapped in poverty. I gratefully appreciate the anonymous referee's comment.

probability of the poor who escaped from poverty in 2013. Therefore, we categorize the sample households into the following unordered categories of poverty transition.

$P_i=1$  Chronically poor (those who were chronically poor in both 2012 and 2013)

$P_i=2$  Transitorily poor (those who escaped from poverty, or fell into poverty in 2013)

$P_i=0$  Chronically never poor (those who were never poor in both in 2012 and 2013; reference group)

Probabilities of three different outcomes based on the multinomial logit model can be written as:

$$\Pr(P_i = j) = \frac{e^{(X_i \hat{\kappa}_j + \hat{\nu}_k \hat{V}_i)}}{1 + \sum_{k=1}^2 e^{(X_i \hat{\kappa}_k + \hat{\nu}_k \hat{V}_i)}}, \quad j = 1, 2, \quad (9)$$

$$\Pr(P_i = 0) = \frac{1}{1 + \sum_{k=1}^2 e^{(X_i \hat{\kappa}_k + \hat{\nu}_k V \hat{E} P_i)}}, \quad j = 0. \quad (10)$$

## 5. RESULTS

### 5.1. Model (a): Determinants of Poverty

Table 3 presents results on determinants of household *ex post* poverty where the coefficients of the probit model are replaced by the marginal effects. Three categories of poverty status based on 100%, 80%, and 120% of poverty line are tested.



**Table 3 Determinant of Poverty — Probit Model**

	2012			2013		
	Poor100	Poor80	Poor120	Poor100	Poor80	Poor120
VEP12_100				0.05 (3.28) <sup>***</sup>		
VEP12_80					0.005 (0.51)	
VEP12_120						0.128 (7.01) <sup>***</sup>
Female Head	0.027 (2.53) <sup>**</sup>	0.008 (1.36)	0.064 (4.23) <sup>***</sup>	0.029 (2.24) <sup>**</sup>	0.012 (1.66) <sup>*</sup>	0.049 (2.75) <sup>***</sup>
Age	-0.014 (8.32) <sup>***</sup>	-0.007 (7.17) <sup>***</sup>	-0.021 (8.77) <sup>***</sup>	-0.01 (4.65) <sup>***</sup>	-0.006 (5.18) <sup>***</sup>	-0.015 (5.00) <sup>***</sup>
Age Square	0.0002 (10.30) <sup>***</sup>	0.0001 (9.17) <sup>***</sup>	0.0002 (10.61) <sup>***</sup>	0.0001 (6.15) <sup>***</sup>	0.0001 (6.70) <sup>***</sup>	0.0002 (6.51) <sup>***</sup>
Having a Spouse	0.035 (3.56) <sup>***</sup>	0.012 (2.22) <sup>**</sup>	0.06 (4.34) <sup>***</sup>	0.041 (3.49) <sup>***</sup>	0.022 (3.50) <sup>***</sup>	0.062 (3.87) <sup>***</sup>
Dependency Burden	0.08 (6.16) <sup>***</sup>	0.029 (4.01) <sup>***</sup>	0.128 (7.10) <sup>***</sup>	0.088 (5.98) <sup>***</sup>	0.033 (4.13) <sup>***</sup>	0.127 (6.14) <sup>***</sup>
Primary School	-0.025 (2.06) <sup>**</sup>	-0.011 (2.01) <sup>**</sup>	-0.033 (1.65) <sup>*</sup>	-0.035 (2.32) <sup>**</sup>	-0.016 (2.36) <sup>**</sup>	-0.038 (1.51)
Middle School	-0.048 (3.98) <sup>***</sup>	-0.024 (4.19) <sup>***</sup>	-0.079 (4.04) <sup>***</sup>	-0.065 (4.36) <sup>***</sup>	-0.027 (4.03) <sup>***</sup>	-0.092 (3.73) <sup>***</sup>
High School	-0.1 (8.14) <sup>***</sup>	-0.048 (7.60) <sup>***</sup>	-0.155 (8.00) <sup>***</sup>	-0.121 (7.76) <sup>***</sup>	-0.058 (7.90) <sup>***</sup>	-0.151 (6.00) <sup>***</sup>
College	-0.097 (7.55) <sup>***</sup>	-0.039 (5.64) <sup>***</sup>	-0.165 (8.27) <sup>***</sup>	-0.108 (6.59) <sup>***</sup>	-0.053 (7.10) <sup>***</sup>	-0.16 (5.95) <sup>***</sup>
University	-0.117 (9.17) <sup>***</sup>	-0.047 (6.68) <sup>***</sup>	-0.193 (9.85) <sup>***</sup>	-0.139 (8.78) <sup>***</sup>	-0.062 (8.03) <sup>***</sup>	-0.203 (7.97) <sup>***</sup>
Master and Above	-0.095 (5.33) <sup>***</sup>	-0.032 (2.93) <sup>***</sup>	-0.178 (7.15) <sup>***</sup>	-0.109 (5.39) <sup>***</sup>	-0.043 (4.00) <sup>***</sup>	-0.168 (5.36) <sup>***</sup>
Regular Based	-0.073 (6.96) <sup>***</sup>	-0.047 (7.32) <sup>***</sup>	-0.108 (7.58) <sup>***</sup>	-0.085 (6.85) <sup>***</sup>	-0.038 (5.16) <sup>***</sup>	-0.109 (6.50) <sup>***</sup>
Self-employed with Hiring	-0.081 (4.34) <sup>***</sup>	-0.047 (3.38) <sup>***</sup>	-0.158 (6.54) <sup>***</sup>	-0.12 (4.86) <sup>***</sup>	-0.048 (2.67) <sup>***</sup>	-0.154 (5.20) <sup>***</sup>
Self-employed without Hiring	0.001 (0.10)	0 (0.09)	-0.02 (1.34)	-0.005 (0.45)	0.008 (1.22)	-0.007 (0.41)
Merit Based	0.003 (0.12)	-0.008 (0.55)	-0.044 (1.28)	-0.071 (2.27) <sup>**</sup>	-0.016 (0.89)	-0.121 (2.86) <sup>***</sup>
Unemployed	0.022 (1.61)	0.006 (0.80)	0.013 (0.73)	0.001 (0.06)	0.009 (1.05)	0.004 (0.18)

Log Net Asset	0.054 (5.32)***	0.024 (4.41)***	0.062 (4.00)***	0.068 (5.47)***	0.024 (3.89)***	0.102 (5.86)***
Log Net Asset Square	-0.006 (9.32)***	-0.003 (7.28)***	-0.008 (8.36)***	-0.007 (9.32)***	-0.003 (6.99)***	-0.011 (9.90)***
DTI	-0.00001 (0.05)	0.0003 (1.38)	0.001 (0.92)	0.00004 (0.27)	-0.0002 (0.51)	0.0002 (0.40)
DTI Square	-0.00001 (0.32)	-0.00001 (1.16)	-0.00001 (0.81)	0.00001 (0.07)	-0.00001 (2.07)**	-0.00001 (0.10)
Observations	9,554	9,554	9,554	8,596	8,596	8,596
Pseudo $R^2$	0.341	0.342	0.308	0.342	0.353	0.316
Joint Significance	Wald chi2(20) = 2,119.17	Wald chi2(20) = 1,518.51	Wald chi2(20) = 2,348.54	Wald chi2(21) = 2,015.80	Wald chi2(21) = 1,551.66	Wald chi2(21) = 2,283.45
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: 1) Robust z-statistics in parentheses. 2) \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Source: SFLC (2012, 2013).

The results are similar across 2012 and 2013 regardless of the levels of poverty line used. For example, the positive and significant coefficient estimates of female head implies that compared to household headed by male, female headed household is more likely to be in poverty. The positive between female headed households and poverty might be explained by Kim (2004) that argues the negative effect of female household head relative to male household is because the earning poverty of female household head is lower than that of male household head, and hence, their consumption expenditure becomes lower. The negative and the positive signs of coefficient estimates in the age of the household head and its square term, both are strongly significant, reflecting the situation of the elderly poverty in Korea.<sup>13)</sup> It might be useful to note the finding from Kang (2014). The peak of household expected consumption in estimating household

<sup>13)</sup> Unlike U shape effect of age on household poverty and vulnerability found in the present study, Imai, Gaiha, and Kang (2011) find the hump shaped effect of age on household poverty and vulnerability in Vietnam. It might reflect that Vietnam is an agrarian economy where the important source of income in agricultural sector. In Vietnam, households headed by elder member tend to own more land or more productive assets than their counterparts, households headed by younger member, and hence records lower poverty incidence.

vulnerability is found at age 46.4. It is similar to age 44 in Kim and Kim (2010) but highly different from age 59 in Hur (2005) drawing upon 2000 data. The change in age where household consumption peaked might reflect socioeconomic change over the past decade, resulting in the change in consumption behavior (e.g., the increase shared of educational expenditure to total consumption, financial crisis in 2008 or aging society etc.).

As we expect, compared to no education which is the reference category and is dropped from the table, higher educational attainments tend to reduce the probability of poverty and strongly significant at 1%. Also, the regular employment or the self-employed with hiring someone other than its household members, the lower probability of poverty is observed. In contrast, having a spouse and higher dependency is positively associated with poverty. The positive and negative signs of the coefficient estimates found from household net asset and its square term respectively suggest that households tend to reduce their consumption until their net asset exceeds certain level of threshold and to increase consumption beyond that threshold. Interestingly, we find the insignificant effect of household debt on household poverty. It might reflect that although poor households are likely to have heavier debt relative to their income, perhaps, due to daily consumption, the better-off households are also associated with higher debt to income ratio due to mainly real estate acquisition. As shown from the last three columns for poverty estimation with 2013 data in table 3, it is tested whether *ex ante* household vulnerability in 2012 influenced on *ex post* poverty status in 2013. The positive and significant coefficient estimates of vulnerability suggest that household vulnerability in 2012 translated into poverty in 2013. Therefore, we empirically confirm the conceptual hypothesis that vulnerability is likely to cause poverty.

## 5.2. Model (b): Determinants of Vulnerability

Table 4 offers the results obtained from vulnerability estimations based on the three poverty lines.

**Table 4 Determinant of Vulnerability — OLS**

	2012			2013		
	VEP100	VEP80	VEP120	VEP100	VEP80	VEP120
Female Head	0.042 (5.12) <sup>***</sup>	0.022 (3.42) <sup>***</sup>	0.067 (6.75) <sup>***</sup>	0.048 (5.27) <sup>***</sup>	0.028 (3.90) <sup>***</sup>	0.074 (6.90) <sup>***</sup>
Age	-0.032 (25.17) <sup>***</sup>	-0.031 (26.23) <sup>***</sup>	-0.029 (20.17) <sup>***</sup>	-0.03 (21.33) <sup>***</sup>	-0.03 (23.45) <sup>***</sup>	-0.025 (16.25) <sup>***</sup>
Age Square	0.0004 (27.58) <sup>***</sup>	0.0003 (27.66) <sup>***</sup>	0.0003 (23.19) <sup>***</sup>	0.0003 (23.23) <sup>***</sup>	0.0003 (24.69) <sup>***</sup>	0.0003 (18.76) <sup>***</sup>
Having a Spouse	0.027 (3.87) <sup>***</sup>	0.022 (4.04) <sup>***</sup>	0.044 (4.99) <sup>***</sup>	0.033 (4.29) <sup>***</sup>	0.022 (3.74) <sup>***</sup>	0.055 (5.78) <sup>***</sup>
Dependency Burden	0.065 (7.07) <sup>***</sup>	0.04 (5.38) <sup>***</sup>	0.077 (7.13) <sup>***</sup>	0.05 (5.11) <sup>***</sup>	0.031 (3.83) <sup>***</sup>	0.068 (5.94) <sup>***</sup>
Primary School	-0.157 (9.89) <sup>***</sup>	-0.149 (9.40) <sup>***</sup>	-0.109 (7.72) <sup>***</sup>	-0.153 (9.61) <sup>***</sup>	-0.163 (9.31) <sup>***</sup>	-0.083 (6.22) <sup>***</sup>
Middle School	-0.245 (14.74) <sup>***</sup>	-0.197 (12.76) <sup>***</sup>	-0.233 (14.61) <sup>***</sup>	-0.269 (15.79) <sup>***</sup>	-0.238 (13.70) <sup>***</sup>	-0.219 (13.73) <sup>***</sup>
High School	-0.304 (19.33) <sup>***</sup>	-0.214 (14.29) <sup>***</sup>	-0.324 (22.01) <sup>***</sup>	-0.337 (20.82) <sup>***</sup>	-0.262 (15.54) <sup>***</sup>	-0.33 (22.15) <sup>***</sup>
College	-0.304 (18.58) <sup>***</sup>	-0.211 (13.68) <sup>***</sup>	-0.34 (21.17) <sup>***</sup>	-0.355 (21.17) <sup>***</sup>	-0.262 (15.16) <sup>***</sup>	-0.367 (22.72) <sup>***</sup>
University	-0.299 (18.45) <sup>***</sup>	-0.206 (13.39) <sup>***</sup>	-0.341 (22.01) <sup>***</sup>	-0.347 (20.88) <sup>***</sup>	-0.259 (15.06) <sup>***</sup>	-0.365 (23.31) <sup>***</sup>
Master and Above	-0.267 (15.78) <sup>***</sup>	-0.186 (11.80) <sup>***</sup>	-0.302 (18.32) <sup>***</sup>	-0.312 (17.92) <sup>***</sup>	-0.239 (13.56) <sup>***</sup>	-0.327 (19.45) <sup>***</sup>
Regular Based	-0.059 (6.79) <sup>***</sup>	0.003 (0.56)	-0.155 (13.84) <sup>***</sup>	-0.065 (6.99) <sup>***</sup>	0.001 (0.11)	-0.146 (12.60) <sup>***</sup>
Self-employed with Hiring	-0.023 (2.44) <sup>**</sup>	0.031 (4.72) <sup>***</sup>	-0.12 (9.98) <sup>***</sup>	-0.019 (1.89) <sup>*</sup>	0.034 (4.47) <sup>***</sup>	-0.105 (8.27) <sup>***</sup>
Self-employed without Hiring	-0.07 (7.38) <sup>***</sup>	-0.02 (2.92) <sup>***</sup>	-0.126 (10.79) <sup>***</sup>	-0.068 (6.69) <sup>***</sup>	-0.026 (3.48) <sup>***</sup>	-0.104 (8.49) <sup>***</sup>
Merit Based	-0.055 (3.81) <sup>***</sup>	0 (0.01)	-0.125 (6.56) <sup>***</sup>	-0.083 (6.02) <sup>***</sup>	-0.009 (0.91)	-0.166 (8.95) <sup>***</sup>

Unemployed	-0.003 (0.23)	0.009 (0.89)	-0.028 (1.89)*	0.029 (2.10)**	0.025 (2.24)**	0.015 (0.99)
Log Net Asset	-0.014 (1.52)	-0.034 (4.01)***	0.032 (3.49)***	-0.015 (1.50)	-0.051 (5.16)***	0.047 (4.92)***
Log Net Asset Square	-0.002 (3.62)***	0 (0.57)	-0.006 (10.45)***	-0.002 (4.07)***	0.001 (1.63)	-0.007 (12.58)***
DTI	0.0003 (2.96)***	0.0002 (2.23)**	0.0004 (3.67)***	0.0001 (1.20)	0.0001 (1.34)	0.0001 (1.58)
DTI Square	0.00001 (0.70)	0.00001 (1.52)	-0.00001 (0.36)	0.00001 (3.26)***	0.00001 (3.98)***	0.00001 (3.20)***
Constant	1.337 (25.71)	1.157 (25.04)	1.315 (23.15)	1.412 (24.56)	1.312 (25.22)	1.256 (20.59)
Observations	9,554	9,554	9,554	8,986	8,986	8,986
R-squared	0.584	0.526	0.595	0.595	0.548	0.597
Joint Significance	F(20, 9,533) = 575.67	F(20, 9,533) = 201.87	F(20, 9,533) = 1,060.52	F(20, 8,965) = 817.07	F(20, 8,965) = 391.70	F(20, 8,965) = 1,270.13
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: 1) Robust *t*-statistics in parentheses. 2) \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

Source: SFLC (2012, 2013).

Most results are similar with the findings from poverty estimations. For example, whether a household headed by a female member, whether a household head has a spouse and higher dependency burden is positively associated with household vulnerability, i.e., higher probability of future poverty, whilst educational attainment and household net asset etc. tend to reduce household vulnerability. However, some particular job categories such as merit-based employment or self-employed without hiring (family business) are not prone to poverty but vulnerability. The debt to income ratio are significant across the levels of poverty line, implying that larger debt burden relative to income level is likely to be a risky factor, making household vulnerable to poverty. Therefore, even though heavy household debt may not have a direct impact on household poverty at current period as seen in model (a), it could push households into poverty in the near future.

### 5.3. Model (c): Role of Vulnerability on Poverty Transition

Table 5 presents a poverty transition matrix depicting the change in poverty status between 2012 and 2013. The national poverty head count ratio slightly increased from 19.2% to 20.8%. Amongst, 6% of poor households in 2012 succeeded in escaping from poverty whereas 7.6% of the non-poor households fell into poverty. However, vulnerability of those who moved out of poverty from 2012 to 2013 is estimated to be high as much as that of those who moved into poverty (27.9% vs. 28.8%). Therefore, this group would fall into poverty again if the existing covariate and household idiosyncratic risks are not properly dealt with. Given that the share of chronically poor households was 13.2%, the figures suggest that the transient poor households account for about half of overall poor households and confirm the findings from earlier studies (Seok, 2007; Sung, 2007; Lee, 2013).

Table 6 presents results from the multinomial logit estimation investigating the impact of vulnerability on poverty transition during the sample period. As the base category is the never poor, the coefficient estimates in table 6 show log odds ratio, i.e., relative probabilities of those who chronically poor (the first columns of each estimation), and those who transitorily fell into or escaped from poverty (the second columns of each estimation). Therefore, if the sign of the coefficient estimates in the first and the second columns are positive, it would suggest higher risk of the chronic and transient poverty respectively. In contrast, the difference in the

**Table 5 Poverty Shift between 2012 and 2013 (%)**

Poverty Status		2013		
		Poor	Non-Poor	Total
2012	Poor	13.2	6	19.2
	Non-Poor	7.6	73.2	80.8
	Total	20.8	79.2	100

Source: Author's calculation from SFLC 2012 and 2013.

**Table 6 Role of Vulnerability on Poverty Dynamics during 2102-2013**  
**— Multinomial Probit Model**

	100% Poverty Line		80% Poverty Line		120% Poverty Line	
	Chronically Poor	Transitorily Poor	Chronically Poor	Transitorily Poor	Chronically Poor	Transitorily Poor
Vulnerability	0.826 (5.27) <sup>***</sup>	0.289 (1.96) <sup>**</sup>	0.334 (1.54)	0.06 (0.32)	1.083 (9.15) <sup>***</sup>	0.577 (4.93) <sup>***</sup>
Female Head	0.325 (2.34) <sup>**</sup>	0.288 (2.56) <sup>**</sup>	0.171 (0.97)	0.273 (2.11) <sup>**</sup>	0.409 (3.47) <sup>***</sup>	0.268 (2.57) <sup>**</sup>
Age	-0.144 (6.16) <sup>***</sup>	-0.091 (4.61) <sup>***</sup>	-0.159 (4.80) <sup>***</sup>	-0.113 (4.87) <sup>***</sup>	-0.137 (6.71) <sup>***</sup>	-0.096 (5.17) <sup>***</sup>
Age Square	0.002 (7.85) <sup>***</sup>	0.001 (5.78) <sup>***</sup>	0.002 (6.51) <sup>***</sup>	0.001 (6.13) <sup>***</sup>	0.002 (8.43) <sup>***</sup>	0.001 (6.15) <sup>***</sup>
Having a Spouse	0.527 (3.82) <sup>***</sup>	0.242 (2.17) <sup>**</sup>	0.605 (3.41) <sup>***</sup>	0.265 (2.06) <sup>**</sup>	0.468 (4.02) <sup>***</sup>	0.257 (2.56) <sup>**</sup>
Dependency Burden	0.982 (6.00) <sup>***</sup>	0.592 (4.41) <sup>***</sup>	0.587 (2.74) <sup>***</sup>	0.638 (4.30) <sup>***</sup>	0.913 (6.43) <sup>***</sup>	0.452 (3.55) <sup>***</sup>
Primary School	-0.298 (1.80) <sup>*</sup>	0.054 (0.33)	-0.333 (2.07) <sup>**</sup>	-0.112 (0.76)	-0.17 (0.93)	0.048 (0.25)
Middle School	-0.638 (3.59) <sup>***</sup>	-0.312 (1.81) <sup>*</sup>	-0.863 (4.41) <sup>***</sup>	-0.243 (1.49)	-0.599 (3.21) <sup>***</sup>	-0.294 (1.49)
High School	-1.373 (7.49) <sup>***</sup>	-0.633 (3.71) <sup>***</sup>	-1.637 (7.36) <sup>***</sup>	-0.856 (5.10) <sup>***</sup>	-1.063 (5.69) <sup>***</sup>	-0.555 (2.84) <sup>***</sup>
College	-1.686 (5.66) <sup>***</sup>	-0.99 (4.51) <sup>***</sup>	-2.177 (4.39) <sup>***</sup>	-1.533 (5.42) <sup>***</sup>	-1.373 (5.66) <sup>***</sup>	-0.861 (3.79) <sup>***</sup>
University	-1.892 (7.54) <sup>***</sup>	-1.176 (5.90) <sup>***</sup>	-2.009 (6.01) <sup>***</sup>	-1.367 (6.27) <sup>***</sup>	-1.589 (7.23) <sup>***</sup>	-1.063 (4.99) <sup>***</sup>
Master and Above	-1.178 (2.84) <sup>***</sup>	-1.392 (4.20) <sup>***</sup>	-1.751 (2.28) <sup>**</sup>	-0.839 (2.38) <sup>**</sup>	-1.238 (3.71) <sup>***</sup>	-1.335 (4.60) <sup>***</sup>
Regular Based	-1.118 (6.69) <sup>***</sup>	-0.536 (4.66) <sup>***</sup>	-1.409 (4.80) <sup>***</sup>	-0.752 (4.96) <sup>***</sup>	-0.887 (7.18) <sup>***</sup>	-0.433 (4.15) <sup>***</sup>
Self-employed with Hiring	-2.935 (2.84) <sup>***</sup>	-1.319 (4.20) <sup>***</sup>	-14.665 (68.43) <sup>***</sup>	-2.346 (3.25) <sup>***</sup>	-1.615 (4.25) <sup>***</sup>	-0.866 (4.15) <sup>***</sup>

Self-employed without Hiring	0.054 (0.42)	0.052 (0.47)	0.084 (0.51)	0.221 (1.77)*	0.041 (0.36)	-0.068 (0.63)
Merit Based	-0.7 (1.49)	-1.03 (2.49)**	-0.393 (0.59)	-1.136 (1.88)*	-0.814 (2.25)**	-1.018 (3.02)***
Unemployed	0.058 (0.37)	0.04 (0.29)	0.189 (0.90)	0.146 (1.00)	0.001 (0.01)	-0.246 (1.85)*
Log Net Asset	0.639 (4.83)***	0.59 (4.61)***	0.459 (3.00)***	0.616 (4.18)***	0.662 (5.58)***	0.63 (4.55)***
Log Net Asset Square	-0.076 (8.71)***	-0.058 (7.42)***	-0.062 (5.95)***	-0.06 (6.41)***	-0.075 (9.76)***	-0.056 (6.79)***
dti2	-0.004 (1.17)	0.001 (0.84)	0.009 (0.68)	-0.001 (0.22)	0.001 (0.51)	0 (0.12)
DTI Square	-0.0001 (0.79)	0.00001 (0.61)	-0.0001 (1.07)	-0.0001 (0.57)	-0.0001 (0.07)	-0.0001 (0.63)
Constant	1.661 (1.95)	0.075 (0.09)	1.495 (1.29)	-0.098 (0.10)	1.78 (2.33)	0.16 (0.20)
Observations	8,596	8,596	8,596	8,596	8,596	8,596
Joint Significance	Wald chi2 (42) = 1,943.27		Wald chi2 (42) = 11,912.81		Wald chi2 (42) = 2,188.68	
Prob > chi2	0.0000		0.0000		0.0000	

Notes: 1) Robust z-statistics in parentheses. 2) \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

Source: SFLC (2012, 2013).

coefficient estimates between the first and the second columns indicates the log odds ratio, i.e., probability of those who were always poor relative to the probability of those who were transient poor. Therefore, the positive sign of the coefficient difference suggests higher likelihood of the chronic poverty compared to the transient poverty.

First, the signs of the coefficient of vulnerability are positive and strongly significant at 1% except the case of 80% poverty line, implying that the more vulnerable households are more likely to be trapped in poverty or to be transient poor. Besides, the positive sign of the coefficient difference



between the first and the second columns (e.g., 0.5364 in the case of 100% poverty line) suggests that the more vulnerable household, the higher probability of chronic poverty relative to transitory poverty. Likewise, female headship and higher dependency burden etc. are more associated with both chronic and transient poverty. In contrast, physical and human capital household assets, for example higher education, tend to reduce both the probability of the chronic and transient poverty. Therefore, education might be interpreted to have both ‘protectional effect’ for the transient poor and ‘promotional effects’ for the transient poor. We found similar results from regular employment status and household net assets etc.

## 6. SUMMARY AND IMPLICATION

In the present study, drawing on Survey of Finance and Living Conditions (SFLC) data, we examine the determinants of *ex post* poverty and *ex ante* vulnerability, and investigate the role of vulnerability on household poverty dynamics. Summary of findings are as follows: (i) Although female headship, the elderly, higher dependency burden or irregular employment etc. are associated with both poverty and vulnerability, some household characteristics such as self-employed without hiring others and higher debt burden relative to household income level etc. are observed not prone to current poverty but to future poverty. Given resource constraint for anti-poverty public interventions, the findings suggest more careful investigation into the vulnerable non-poor households are necessary because they are more likely out of public safety net. Therefore, government needs to make efforts for more accurate and effective policy targeting for durable poverty reduction (Yun and Koh, 2011).

We also observed that (ii) not only does vulnerability translate into poverty but also it tends to perpetuate poverty. It implies that households are likely to be trapped in poverty once they could not properly deal with uninsured shocks, as generally they do due to insufficient risk management instruments.

Hence, apart from targeting the currently poor, public actions reducing household vulnerability *ex ante* by, for example, the expansion of social insurance schemes is also suggested because it is more cost-efficient rather than eliminating chronic poverty *ex post*. On the other hand, the more vulnerable poor households are already trapped in poverty due to a variety of structural factors (e.g., lower productivity or limited access to labor market, etc.). Public interventions aiming the improvement of job competency through job training, creation of quality jobs or affirmative action program removing discrimination are suggested to help them.

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