Dynamic of Asset Poverty in South Korea

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Abstract

Following the Asian Financial Crisis of 1997, Korea has suffered what many consider to be a severe poverty problem. Despite policy efforts to reduce poverty and economic recovery in the early 2000s, poverty affects many households and certain households are at risk of staying in poverty once they are in it. Using longitudinal panel data from 2005 to 2014, this study defines three indicators of poverty based on asset holdings, rather than income. It then examines the dynamics of asset poverty in Korea across the study period. The study's primary goal is to reveal differences across the three indicators and identify which groups of poor people in Korea have been structurally trapped in poverty. We applied a dynamic panel model of discrete choice to the Korean Welfare Panel Study (KOWEPS) from the 1st to 10th waves and show that, despite the indicator, the asset poor who experienced asset poverty in the previous surveyed year or at wave 1 are likely to fall into structural and persistent poverty over time. In addition, the probability of incurring asset poverty decreased with home ownership, higher disposable income, and greater diversification of the household portfolio. Future research should study the duration of asset poverty to complete a comprehensive picture of the asset poverty condition.

Key words: Asset poverty dynamics, poverty, welfare policy, South Korea, dynamics panel model of discrete choice

1. Introduction

Until the late 1990s, South Korea (hereafter referred to as Korea) enjoyed a more equal income distribution than that of many other advanced economies, including the US and UK, despite weaknesses in its social security system. However, following the Asian Financial Crisis of 1997, Korea's absolute poverty rate as measured by disposable income rose substantially from 2.2% in 1997 to 6.6% in 1999 as many people capable of working were laid off or unable to find jobs, and put at risk of poverty (Kim, Kim, Uh, & Lee, 2012). In response, the Korean government rapidly expanded its social welfare system of social insurance and social assistance payments. Social expenditures as a percentage of GDP rose from 3.6% to 10.4% between 1997 and 2014 (Koh et al., 2012). Despite policy efforts and the rebound of the economy, poverty continues to affect many households in Korea. Further, depending on the indicators used, once in poverty certain households are at risk of staying in poverty. Social research that identifies households with elevated risk can be used to better understand the condition of poverty and its dynamics.

As in most countries, standard poverty research in Korea has been conducted using income as a proxy for well-being and using cross-sectional household surveys. These studies have greatly expanded the knowledge base about the prevalence of poverty and its correlates. The standard approach to studying poverty is not without limitations, however. First, income measurement alone may distort the true condition of poverty. For example, some have suggested income poverty analysis makes households appear to enter or exit poverty when in reality their more broadly defined living conditions, including assets, health, consumption, expenditures, and more broadly, functioning and capabilities, did not change (Baulch & Hoddinott, 2000; Sen, 1979). Consider a situation whereby a household suffers a temporary income shock and falls into

poverty. If their assets were not degraded, a household could smooth their consumption level by spending down their assets until they find a new source of reliable income. In terms of research designs, cross-sectional measures are of limited use for understanding transitions in and out of poverty. By definition, cross-sectional measures of poverty are unable to distinguish between households experiencing short stints of poverty to households that may have spent year after year in the condition. In light of these limitations with standard poverty research, and to better understand the condition of poverty, scholars have argued for asset-based measures of poverty that employ longitudinal designs (Carter & Barrett, 2006; Dutta, 2015).

The present study complements the existing field by examining asset poverty dynamics in Korea using longitudinal panel data between 2005 and 2014. We focus the inquiry on people in Korea who are at greater risk of staying in poverty once they experience it. Among the existing asset poverty literature, conclusions are mostly drawn from western countries, African and Asian low- and middle-income countries. The focus on assets with longitudinal data from Korea contribute timely and novel insight into what it means to be poor in a high-income Asian country.

2. Assets as an Alternative to Income

Measuring poverty based on income has long been critiqued in the social sciences. Weisbrod and Hansen (1968) were among the first to propose a measure of welfare that incorporated asset wealth into traditional measure of welfare. Later, sociologists Oliver and Shapiro (1990) and social welfare scholar Sherraden (1991) provided in-depth accounts on the importance of assets. Sherraden argued that although income is a straightforward, simple, and transparent measure, assets provide a better understanding of the multidimensional conditions of well-being, and its inverse: poverty. Two theoretical orientations on the importance of assets

have since emerged: consumption and developmental. The meaning of the asset poverty construct varies depending on which framework is employed. Below, we introduce the consumption and developmental perspectives and provide examples for how the approaches have been applied to asset poverty.

2.1. The Consumption Perspective

In this more common consumption perspective, assets are defined as a storehouse for future consumption following the life cycle and buffer-stock models. Savings as a way of balancing the fluctuation of household financial resources for consumption throughout a lifetime (Ando & Modigliani, 1963; Carroll, Hall, & Zeldes, 1992). Particularly in the buffer-stock model, assets can shield household's consumption against unpredictable income loss and expenses, such as unemployment or sudden medical costs (Carroll, 1997). Therefore, the asset poverty measure derived from consumption theory contributes to understanding how long a household can survive when income streams are disrupted by unforeseen events such as sickness, unemployment, or retirement. From this perspective, Haveman and Wolff (2005) defined the most frequently cited operationalization of asset poverty as 'a household with insufficient assets to enable it to meet basic needs for a period of time' (p.149). To measure basic needs, they used the family-size conditioned poverty threshold, which gives a dollar amount for food, clothing, shelter, and a small amount to allow for other everyday needs. Haveman and Wolff (2005) stipulated three months (25% of a year) as the period for which assets should be expected to cushion income losses. Lastly, they counted net worth and liquid assets as wealth-type resources. While net worth was measured in terms of the difference in value between total marketable assets and total liabilities, liquid assets were based on more restrictive criteria including cash and other financial assets that could be easily monetized (Haveman & Wolff, 2005).

2.2. The Development Perspective

In contrast to the consumption perspective, social development theory defines assets as a resource for investing in opportunities for upward mobility. Importantly, the effects of asset holding are hypothesized to extend beyond maintaining consumption needs. From this perspective, the asset poverty measure can be used to ascertain whether a household has the financial capacity required to improve economic and social mobility. Examples of assets that promote such mobility are education, home ownership, and business start-up. From a developmental perspective, Nam, Huang, and Sherraden (2008) suggested that asset poverty can be measured by the minimum amount of financial assets necessary to achieve home ownership. For this measure, the median housing price or bottom-quartile housing price can be used as asset poverty threshold (Nam et al., 2008). Shapiro, Oliver, and Meschede (2009) suggested the *Asset Opportunity Index*, which includes three different types of mobility investment: average expenses for two years at a public university, average down payment for a median-priced home, and average start-up expenses for a business. The cost of each of these potential mobility opportunities was suggested at \$12,000 (Shapiro et al., 2009). The asset poverty measures by Nam et al. (2008) and Shapiro et al. (2009) were explicitly based on the assumption that home ownership is associated with a variety of life opportunities along with the psychological benefits of stability and stake-holding (Nam et al., 2008; Shapiro, 2004).

3. Empirical Literature Review

Within poverty research there exists a considerable distinction between research that identifies correlates of poverty using cross-sectional studies and studies that identify causes with longitudinal panel data. The great strength of panel studies is they can distinguish between those who are poor at a particular point-in-time versus those who are poor for longer or shorter

periods. As such, the ability to distinguish poverty duration heightens the understanding of the condition and has implications for policy-relevant questions centering on dependency and a culture of poverty (Bane & Ellwood, 1986).

Only a few studies have examined the dynamics of asset poverty. Empirical studies in the US and Asian and African countries suggest that current poverty will lead to future poverty (Caner & Wolff, 2004; Dutta, 2015; Rank & Hirschl, 2010; Zimmerman & Carter, 2003). For example, by using the Panel Study of Income Dynamics (PSID) data in the US from 1984 through 1999, Caner and Wolff (2004) found that around 60% of those experiencing net worth poverty in a given year were net worth poor five years later. In addition, by using the PSID data from 1999 through 2007, Leonard and Di (2013) found that among households that exited asset poverty, those who had a longer history of asset poverty prior to exiting were more likely to re-enter asset poverty. By using the panel data from the agricultural area of Burkina Faso in West Africa, 1981 to 1985, Zimmerman and Carter (2003) demonstrated that the initially asset poor were not able to accumulate assets over time and therefore tended to remain trapped in asset poverty.

The experience of asset poverty differed with race, education, home ownership, employment type, and family structure across time. Studies found that individuals (or households) were more likely to be asset poor if they were black, low income, less educated, unmarried, and renters (Caner & Wolff, 2004; Leonard & Di, 2013; Rank & Hirschl, 2010). Moreover, having a high share of productive assets (e.g., business, non-house real estate, stock or bonds) reduced the probability of asset poverty occurrence (Leonard & Di, 2013; Zimmerman & Carter, 2003). Because a high share of productive assets leads to a high rate of return on assets,

initially poorer households with a low share of productive assets cannot have a chance to accumulate assets over time, and therefore tend to remain trapped in poverty.

To our best knowledge, Kang and Yoo (2009) and Suk (2011) provided the only empirical research on the dynamics of asset poverty in Korea using longitudinal panel data. Measuring asset poverty as 50% of median net worth from 1999 to 2005, Kang and Yoo (2009)'s main finding was that only 25% of the asset poor exited asset poverty within two years and 37% remained in asset poverty more than six years. When compared to Ku (2005)'s finding that 58% of the income poor exited poverty within two years in Korea, Kang and Yoo (2009)'s finding on the dynamics of asset poverty suggests that the asset poor tend to remain in poverty longer than the income poor. Suk (2011) used a four-year panel data and presented that the asset poor were more likely to stay in poverty over time than the income poor. The probability of staying poverty when applying net worth was around 70% from 2005 to 2008, compared to around 50% when applying income during the same period (Suk, 2011).

Although exiting research provides empirical evidence about the persistence of asset poverty across time, it suffers from certain limitations. First, most previous research around the world on the dynamics of asset poverty defines assets according to consumption theory: as a resource to maintain basic needs. This definition overlooks the role of assets in enhancing life opportunities and social mobility, as posed in social development theory (Midgley & Sherraden, 2000; Shapiro et al., 2009; Sherraden, 1991). Furthermore, some existing research has overlooked certain important variables. Financial assets, for example, were not considered in Kang and Yoo (2009)'s study of the dynamics of asset poverty in Korea. This omission is important because previous research in the US (e.g., Rank & Hirschl, 2010) revealed that individuals were more likely to experience financial asset poverty across their life courses

compared to net worth poverty. At present, we have an incomplete and dated understanding of asset poverty in Korea.

4. Research Questions

Our study of asset poverty dynamics contributes to the measurement of well-being in at least two ways. First, we employ and contrast multiple asset frameworks – consumption and developmental - to provide a more complete picture of the relationship between assets and well-being. Second, the present study examines the dynamics of asset poverty in Korea using ten years of longitudinal panel data. Understanding which groups are likely to enter, exit, stay, and re-enter the condition of asset poverty sheds light on a new phenomenon. The following questions guide the study: (a) How does the probability to incur asset poverty vary by different theoretical and conceptual framework (i.e., consumption and development theory) during 2005 to 2014?, (b) Is the probability to incur asset poverty persistent over time?, and (c) Which social groups are most likely to experience asset poverty over time?

5. Method

5.1. Sources of Data

The data came from the Korean Welfare Panel Study (KOWEPS) between 2005 (1st wave) and 2014 (10th wave), a longitudinal panel study annually conducted by the Korean Institute for Health and Social Affairs (KIHASA) and Seoul National University (SNU) since 2006. The KOWEPS is widely used in Korean poverty research because of the low income oversample and relatively large sample size and scope (Noh et al., 2015). Household socio-demographics, assets, debts, income, material hardship, and welfare needs are measured in detail. The KOWEPS survey asks for information about the prior year, and the collected data of each year reflects conditions in the year previous to the survey year. For example, for the 1st wave

surveyed in 2006, stock variables (e.g., assets) were measured on December 31th, 2005, and flow variables (e.g., income and expenditure) were measured over the year of 2005. In the first year (2006), the KOWEPS collected information about 7,072 households and 14,463 individuals selected by a two-stage stratified random sampling method that considered the region where they live. The scope of the data covers the entire nation, including Jeju Island. To examine the welfare needs and living conditions of low income households, 50% of the sample was composed of a low income group whose household income was below 60% of median disposable income (Noh et al., 2015). In the latest panel survey (10th wave), the retention rate of the original sample was nearly 67.31% (4,760 households). Our study sample includes all available observations at each wave from 2005 to 2014 that were observed in the first wave and provided complete information on the variables used in the analysis¹.

5.2. Measurement

5.2.1. Assets

In alignment with previous efforts, we focus on assets in the form of net worth and financial assets. We defined net worth as the difference in value between total marketable assets and total debt. Specifically, total marketable assets included three types of assets: (1) real property (owner-occupied housing, residence deposit, and other real estate), (2) hard assets (e.g., vehicle, jewelry, art, and collectibles), and (3) financial assets (savings including retirement savings, stocks, bonds, funds, insurance funds, and money loaned to the mutual assistance society). Total debts includes mortgage debt, private loans, credit debt, money received as key money, money received on credit from the mutual assistance society, and other debt (K. S. Kim

¹ Depending on the definition of asset poverty used, 25%-74% of the full sample of 7,072 households were never observed in asset poverty. These households who never experienced asset poverty during the observation period (2005 – 2014) were excluded from the analysis on the dynamics of asset poverty.

& Kim, 2013; Statistics Korea, 2015). The value for financial assets was the third component of total marketable assets as described above. All absolute values were reported in constant US dollars (1:1,000 = USD: KRW).

5.2.2. Dependent variable: Asset poverty.

Asset poverty from a consumption perspective applied the Haveman and Wolff (2005) measure in the Korean context. Three key components had to be identified: (a) basic needs, (b) period of time, (c) wealth type resources. Korea's official absolute poverty threshold, the national minimum living standard (MLS), constituted basic needs. The Korean MLS is calculated on the basis of the minimum cost of 11 necessities such as food, shelter, and utilities, and updated annually using the Consumer Price Index (CPI; Kim et al., 2013). The MLS is applied differently according to the household size by adopting a modified OECD household equivalence scale² (T. W. Kim et al., 2013). We applied 150% of the MLS because the MLS level is insufficient to reflect actual living conditions. Rather, 120% or 150% of the MLS has been widely used as the poverty threshold in Korean poverty research (e.g., C. H. Kim, Ra, & Ryu, 2013; K. S. Kim & Kim, 2013; B. H. Lee & Ban, 2009). We chose 150% of the MLS threshold to facilitate comparison with other studies of asset poverty in Korea and because of its policy relevance (the threshold has been employed in asset building programs in Korea; the Hope Growing Account and Hope Plus Account programs). To provide context, 150% for a family four living in Korea in 2014 was US\$ 2,445 a month. Next, we stipulated the period of time as three months, following Haveman and Wolff (2005) and Korean research on asset poverty (e.g., K. S. Kim & Kim, 2013; S. E. Lee, Yi, & Jung, 2011). In Korea, the three months has additional validity as credit card bills and public utility charges are allowed to be overdue for a maximum

² Appendix A1 presents the national MLS from 2005 to 2014 according to a number of household members.

of three months (K. S. Kim & Kim, 2013). Lastly, we applied both indicators of assets - net worth and financial assets - resulting in two asset poverty indicators. While net worth gives a comprehensive picture of all assets minus debts, financial assets constitute resources that could be easily liquidated during a personal financial crisis (Rank & Hirschl, 2010; Shapiro et al., 2009). We labeled these indicators as “*Consumption 1* (net worth)” and “*Consumption 2* (financial assets).”

From a social development perspective, we created the third indicator of asset poverty based on developmental theory of assets from Nam et al. (2008) and Shapiro et al. (2009) in the American context. Specifically, we operationalized this asset poverty indicator as the ‘minimum amount of assets necessary to achieve home ownership’. In Korea, around 80% of total household assets take the form of home ownership and real estate (Statistics Korea, 2015). Following Yadama and Sherraden (1996) and Zhan and Sherraden (2003), we defined assets as the value of owner-occupied housing and financial assets. We also included residence fixed deposit because long-term rental housing with a large amount of fixed deposit is the most common residence type in Korea (Kim et al., 2013). The purpose of including these in the definition of assets is to consider the economic resources that would be reasonably available to a household aspiring for home ownership. For the poverty threshold, we followed Shapiro (2004) and Shapiro et al. (2009) and applied the minimum down payment. In Korea, this minimum requirement is 10% of the appraised home value. To approximate the appraised home value, we used the median housing price that is monthly updated by the Korean Appraisal Board. To account for a huge discrepancy in housing price between Metropolitan and non-Metropolitan areas (around \$163,000 in December 2015) in Korea, we applied different thresholds for

Metropolitan and non-Metropolitan residents³. Thus, within the development framework, we defined the asset poor as a household whose value of owner-occupied housing, residential fixed deposit, and financial assets was less than the down payment (10%) of the median housing price. We labelled this indicator as “*Development*”.

5.2.3. Explanatory variables

We chose 13 socioeconomic and demographics variables to gain insight into which groups were most at risk for different types of asset poverty. These were treated as explanatory variables based on a review of literature of factors influencing asset poverty including the asset poverty state in the previous year. Housing tenure status, residential area, ratio of productive assets to total assets, income, number of household members, and number of workers were measured at the household level. Age, gender, marital status, and education level refer only to the household head. For household disposable income, we divided disposable income by the number of household members (per capita) and transformed it into a natural logarithm, to reduce the variability of the data and make it conform more closely to the normal distribution. Detailed description on explanatory variables presents in the Table 1.

[INSERT TABLE 1 ABOUT HERE]

5.3. Analytical Plan

We applied the dynamic panel model of discrete choice (binary outcome variable) to the longitudinal component of the KOWEPS data for years 2005 to 2014. The dynamic panel model of discrete choice is widely used to analyze the persistence of dynamic events such as unemployment, labor force participation, and poverty (Giarda, 2013; Heckman, 1981a). This model has advantages in addressing the issues surrounding the panel data such as sample attrition

³Appendix A2 presents the down payment (10%) of the median housing price in metropolitan and non-metropolitan areas from 2005 to 2014.

and explanatory variables that change in value over the observational period (Allison, 1982). It assumes that individuals who have experienced an event in the past are more likely to experience an event in the future than are individuals who have never experienced the event. The conditional probability that an individual will experience the event in the future is a function of past experience (Heckman, 1981a). Moreover, this conditional relationship between future and past experience can be explained by true state dependence. True state dependence is caused by the structural relationship between past and current experience of events (Heckman, 1981a). If the unobserved heterogeneity was not properly controlled and influenced the probability of experiencing the event over time, a conditional relationship between past and current experience is termed spurious state dependence (Heckman, 1981a).

To form the analytical sample, we excluded households who do not experience poverty during the study period. To be included, households experienced asset poverty at least once between 2005 and 2014. It follows that the sample size varied across the poverty indicators: $n = 1,869$ households in the sample with the net worth definition of assets (Consumption 1), $n = 5,273$ households in the sample with the financial assets definition (Consumption 2), and $n = 2,688$ households in the sample with the development definition of assets (Development). To implement the dynamic panel model, we rearranged data into a person-year format where each subject was assigned a person-year for every year of observation time (ten years) that they were at risk for asset poverty. These person-year observations became the unit of analysis. The person-year data set contains observations representing each year of observation time. Accordingly, if a household were observed for ten years without missing information on the dependent variable (asset poverty state), they would have ten person-year observations. The observation continues until time t , at which point the observation is right censored. Censoring means that an individual

is observed at time t , but not at $t+1$. It is assumed that time of censoring is independent of the probability for the occurrence of events (Allison, 1982). In the present study, separate data sets were created for each of the three poverty indicators: 9,532 person-year observations in the sample with the net worth definition of asset (Consumption 1), 33,204 in the sample with the financial assets definition (Consumption 2), and 13,773 in the sample with the development definition of asset (Development).

A dynamic panel model of discrete choice for $i = 1, \dots, N$ and $t = 1, \dots, T$, was defined as:

$$y_{it} = 1[\alpha + x_{it}\beta + \gamma y_{i,t-1} + v_i + \varepsilon_{it} > 0]$$

where y_{it} is a discrete variable taking the value 1 if a household is experiencing asset poverty at time t and zero otherwise. $y_{i,t-1}$ is the lagged outcome variable (asset poverty state in the previous year), and x_{it} ⁴ represents the explanatory variables at time t . v_i is permanent unobserved heterogeneity (individual-specific effects) and ε_{it} is the random error term (transitory unobserved heterogeneity). In this model, γ represents “true” or “structural” state dependence, and v_i represents “spurious” state dependence. In the present study, we used random effects model by assuming that the unobserved heterogeneity (v_i) is exogenous (uncorrelated with all observed variables) to control for its effects (Allison, 2009). The assumption on the random distribution of v_i is usually satisfied by national panel data with a random sampling model such as the KOWEPS (Min & Choi, 2013).

In addition, to account for what is called the initial value problem we included the initial condition y_{i0} (i.e., asset poverty state at the first wave) in the model. This problem occurs when the starting point of a survey is not the beginning of a process (Akay, 2012; Contoyannis, Jones,

⁴ It assumes that x_i are strictly exogenous conditional on v_i and $y_{i,t-1}$.

& Rice, 2004). For example, in the present study, some households entered asset poverty before they started to be observed in 2005. In much applied work in the social sciences, this initial condition problem is often assumed to be truly exogenous (Heckman, 1981b). The exogenous initial conditions assumption is very naive, except in some cases, and may lead to a severe bias when the process has been in operation prior to the time it is sampled, and the disturbances of the model are serially dependent (Akay, 2012; Heckman, 1981b). Considering this, we adopted the approach suggested by Wooldridge (2005) that deals with the initial condition problem in non-linear dynamic random effect models by modeling the distribution of the unobserved effect conditional on the initial value y_{i0} and any exogenous explanatory variables x_i , so that,

$$y_{it} = 1[\alpha + x_{it}\beta + \gamma y_{it-1} + \bar{x}_i\lambda + \rho y_{i0} + k_i + \varepsilon_{it} > 0] \quad (3)$$

where v_i (unobserved heterogeneity) = $\bar{x}_i\lambda + \rho y_{i0} + k_i$ and $\bar{x}_i$ is time-averaged explanatory variables as $\bar{x}_i = \frac{1}{T} \sum_{t=1}^T x_{it}$. The time-averaged explanatory variables $\bar{x}_i$ are included in the model to control for possible correlation between them and the unobserved heterogeneity term. Same as the model above, $y_{i,t-1}$ is the lagged outcome variable (asset poverty state), x_{it} represents the explanatory variables at time t , and ε_{it} is the random error term. We called this model the Wooldridge probit model. With this model, we can obtain a conditional probability which is based on the joint distribution of observations conditional on the initial values and explanatory variables (Akay, 2012). We adjusted standard errors for clustering by household unit and performed all analyses using Stata 14.

6. Results

6.1. Trends in Asset Poverty Condition

Figure 1 describes the probability of transition in asset poverty state from year to year. We divided the asset poverty transition into three events: (a) entering poverty (non-poverty to

poverty), (b) exiting poverty (poverty to non-poverty), and (c) staying in poverty (poverty to poverty). Household that stayed in poverty at all waves were included when analyzing the probability of staying in poverty from year to year. Across all three events, financial asset poverty (Consumption 2) had the highest probability. It is consistent with previous research that suggests the asset poverty rate when applying financial assets was higher than the net worth poverty rate in Korea (Kim & Kim, 2013; Suk, 2012). For the other two indicators, interestingly, while the probability of staying in poverty was higher in the sample using the development definition of assets (Development) than in the sample defined by net worth (Consumption 1) across time, the probability of entering and exiting poverty was similar in the two samples.

[INSERT FIGURE 1 ABOUT HERE]

6.2. Summary Characteristics

Table 2 reports summary statistics on the samples between 2005 and 2014 according to the different asset poverty indicators. In 2005, between 41% and 67% of households experienced asset poverty in 2005, depending on the indicator. While the home ownership rate was only 22-27% when including home equity in the definition of assets, 53% were homeowners when excluding home equity and only including financial assets in its definition. The average ratio of productive assets varied widely across the different indicators, ranging from 4% (Consumption 1), 10% (Development) to 12% (Consumption 2). The logarithm of yearly disposable income was highest (8.96; around \$7,785) with the Consumption 2 indicator followed by the Consumption 1 and Development (8.88; around \$7,186). For all three indicators, heads were middle-aged, male, and less educated (less than high school education), and had precarious employment status such as unemployed, temporary worker, and self-employed.

[INSERT TABLE 2 ABOUT HERE]

6.3. Estimates of Dynamic Panel Model

Table 3 summarizes the average marginal effects (AMEs) of lagged poverty state and household level variables on the probability to incur asset poverty estimated by the Wooldridge probit model between 2005 and 2014. The AMEs is the average of the changes in the predicted probabilities as the binary independent variable changes from 0 to 1. The estimated effects of the lagged poverty state show the evidence of state dependence, with a statistically significant value for all three indicators. After controlling the initial observations and any exogenous explanatory variables in the Wooldridge model, the effects of lagged poverty state were statistically significant. It was associated with a 14-20% increase in the probability to incur asset poverty for all poverty indicators, after controlling for socioeconomic and demographic characteristics. A household's initial poverty condition (in 2005) was statistically significantly related to the financial assets (Consumption 2) and development indicators of asset poverty (Development). This implies that households who were in asset poverty in 2005, and thus more likely to have a longer history of asset poverty, were associated with a 4-6% higher chance of experiencing asset poverty in the future time t .

Home ownership, a higher ratio of productive assets in the asset portfolio, and a higher disposable income led to a significant decrease in the probability to incur asset poverty in most analysis samples. While the current asset or income variables (e.g., home ownership, productive assets, and $\ln(\text{income})$) were regarded as a measure of household's transitory asset or income status, the time-averaged mean variables (e.g., mean home ownership, mean productive assets, and mean $\ln(\text{income})$) were regarded as a measure of a household's long-term or permanent asset or income status (Contoyannis et al., 2004). For the Consumption 1 and Development indicators, current home ownership status statistically significantly led to a 32 – 37% reduction in the

probability to incur asset poverty. On the other hand, for the Consumption 2 indicator that does not include home equity, mean home ownership (long-term home ownership status) was statistically significantly associated with a 15% decrease in the probability to incur asset poverty, but current home ownership was not statistically significant. For the Consumption 1 indicator, the current ratio of productive assets statistically significantly decreased the probability to incur asset poverty, while the long-term ratio of productive assets had a positive effect. On the other hand, the directions of effects were reversed for the Development indicator (a positive effect for the ratio of productive assets and a negative effect for the mean ratio of productive assets). Current higher income status statistically significantly decreased the probability to incur asset poverty by 13 to 17% across all three indicators. The long-term (or permanent) income variable was statistically significant only for Consumption 2.

In this analysis, most explanatory variables on household's socio-economic and demographic characteristics were not statistically significant for the probability of being in asset poverty. We suspect that conditioning on the time-averaged household socioeconomic characteristics may have rendered the most current household characteristics nonsignificant.

[INSERT TABLE 3 ABOUT HERE]

7. Discussion

The present study examined the persistence of asset poverty and its determinants over time in Korea, using the KOWEPS data of 2005-2014. This study contributes to identifying those among the poor who remain in structural and persistent poverty status over time. To better understand how the condition of asset poverty varies depending on the concept of assets, we measured asset poverty using the consumption and development indicators.

By using the Wooldridge probit model, we found that after conditioning on the initial poverty state and time-averaged explanatory variables, the probability to incur asset poverty at time t positively depends upon the lagged asset poverty state at time $t-1$. The effect of lagged poverty state was largest with the Development indicator followed by Consumption 2 and Consumption 1. Furthermore, a household's initial poverty state (at wave 1) was a statistically significant predictor of asset poverty experience only for the Consumption 2 and Development indicators.

The significant effects of lagged poverty state and initial poverty condition suggest that the risk for asset poverty is persistent over time, especially when considering assets as resources that enable investment in socioeconomic development such as home ownership, education, and business. This finding implies that a household that experiences inadequate asset capacity to invest in life opportunities may be more likely to be structurally trapped in asset poverty. The initial asset poverty condition contributes to unequal distribution of life opportunities and restricts a household's capacity for upward mobility. Accordingly, asset poverty perpetuates and may deepen over time and reinforce already present mechanisms of social stratification (Shapiro, 2004). Contrary to the expectations of life cycle theory, time may not always be the ally of asset poor households (Carter & Barrett, 2006; Zimmerman & Carter, 2003). In addition, considering that wealth is mostly transmitted across generations by social development including educational advantages or home ownership (Pfeffer & Killeward, 2015), asset poverty as measured by the development definition may be persistent across generations.

As expected by previous research, the present study revealed that home ownership and greater ratio of productive assets statistically significantly decreased the chance to incur asset poverty over time for most indicators. Home ownership had a great negative effect on the

probability of asset poverty experience not only for indicators that include home equity in the asset definition (Consumption 1 and Development) but also for the indicator that only considers financial assets (Consumption 2). This finding is in line with previous research by Grinstein-Weiss, Key, Guo, Yeo, and Holub (2013) showing that for low- and moderate-income households, homeowners experienced a greater increase in not only net worth and total assets but also non-housing net worth relative to renters after controlling the factors that cause both homeownership and increases in wealth. Furthermore, in difficult times such as retirement, unemployment, or sickness, homeowners can draw on their home equity, which protects them from falling into poverty (Chan & Chou, 2017). Findings also reveal that the asset portfolio allocation in productive assets might reduce the probability to incur asset poverty. Considering that productive assets are owned by more affluent households, this variable may reinforce the current asset distribution by offering high returns (Giarda, 2013; Zimmerman & Carter, 2003). However, the present study also shows that increase in ratio of productive assets often led to a rise in the probability to incur asset poverty, albeit with a small magnitude of effects (.002). This finding implies that we must consider the risks associated with more productive portfolio allocations; high ratio of productive asset can sometimes lead to an erosion in a household's assets (Leonard & Di, 2013).

The results are highly relevant for policies aimed at improving household's permanent welfare status. First, policymakers and researchers should consider alternative indicators of poverty based on both the income and assets at a household's disposal. Using the asset criterion to complement to the income rules provides a better gauge of available resources required for the multi-dimensional life condition than the current official poverty threshold based exclusively on income (Wolff, 1990). Next, the present study suggests that home ownership has been

significantly associated with a decrease in the probability to incur asset poverty for the last decade. Despite its importance, only 10.8% of those at the bottom quintile of asset distribution in Korea are homeowners while in the top quintile, 84.5% are homeowners (Statistics Korea, 2015). Therefore, a progressive policy strategy that promotes home ownership in Korea may lead to other consequences, such as reducing the prevalence of asset poverty. Lastly, as previously mentioned, the risks and returns need to be properly balanced in household asset portfolio (Leonard & Di, 2013). Accordingly, the wide distribution of financial education programs among disadvantaged group is needed to encourage the asset poor to make prudent investment decisions and accumulate assets.

7.1. Limitations and Implications

The study's findings should be interpreted in the context of a few limitations. First, we cannot include the duration of asset poverty in the model because of censoring. Across the three indicators, the full duration of around 60 – 80% of total asset poverty spells (the duration of time between the beginning and end of poverty) was unknown due to left- or right-censored⁵ observations. Because an analysis of how long households have been in poverty can give a comprehensive picture of the poverty condition (Iceland, 1997), future research needs to include households' multiple poverty spells in the model. One possible data resource for such a study is the Survey of Household Finance and Living Conditions established by the Statistics Korea in 2012. It is a longitudinal panel study composed of 20,000 households and is conducted annually. Considering its large sample size and high retention rate (82.8% in 2015), once it has accumulated data over a sufficient period of time, the Survey of Household Finance and Living

⁵ Left censored were spells for which we observe the end but not the beginning. Right censored are those spells for which we observe the beginning but not the end.

Conditions could be a suitable data resource to further analyze the dynamics of asset poverty in Korea.

Second, the choice of poverty measures, specifically thresholds and resource measures, to some degree, involve arbitrary assumptions (Blank, 2008). Here, the resource measure is defined which resources are counted for each family; the sum of these resources is compared to the threshold to determine whether the person or household is poor (Blank, 2008). We chose poverty measures driven by consumption and developmental theory, but even in the same context, we can choose different measures. If other measures were chosen those would describe different picture of poverty. For example, in the developmental context, Dutta (2015) considered the health and education dimension along with productive asset dimension as a threshold to estimate the poverty dynamics in rural India. In terms of resource measures, she included not only household durable goods, land, and livestock, but also human capital in the asset poverty index, while we considered the home value and financial assets. By using this poverty measure, Dutta (2015) found that household asset dynamics in India varied according to the household's under-nutrition or education status.

Lastly, future research is necessary to examine the extent to which asset poverty is reproduced across generations in Korea. According to social stratification theory, assets play a major role in transmitting class status across generations (Nam et al., 2008; Shapiro, 2004). Investigating intergenerational asset transfers will contribute to understanding how class and poverty is inherited across generations and how low intergenerational asset persistence leads to unequal life opportunities in future generations (Pfeffer & Killeward, 2015).

Table 1.

Description of Explanatory Variables in the Dynamic Panel Model of Discrete Choice

Variables	Description
Lagged poverty state	Asset poverty state in the previous year
Home ownership	Housing tenure status (0 = Home owner, 1 = Renter)
Productive assets	Percentage of total assets invested in non-house real estate, stock, and bonds
Ln(Income)	Total household yearly disposable income divided by the number of household members – per capita; for analysis, the variable was calculated as the natural log of “per capita” household income
Region	Residential area (0 = Metropolitan, 1 = Non-metropolitan area)
Household size	The number of household members
Number of workers	The number of workers in a household
Year variable	Pre- and post-Global Financial Crisis of 2008
Age	Head age (0 = 40-60, 1 = Under 40, 2 = 60 or older)
Gender	Head gender (0 = Female, 1 = Male)
Marital status	Head marital status (0 = Married, 1 = Divorced /widowed /separated, 2 = Single)
Education level	Head educational level (0 = Less than high school, 1 = High school graduation, 2 = College or higher)
Employment type	Head employment type (0 = Permanent worker ^a , 1 = Unemployed, 2 = Temporary worker ^b , 3 = Self-employed)

Note. ^a Employees whose contracts last for 12 months or more and are entitled to receive fringe benefits from their employers; ^b Employees whose main job is a fixed term contract lasting not more than one year, occasional, casual or seasonal work, or work lasting less than 12 months

Figure 1-A. Year-to-year probability of entering asset poverty, 2005 – 2014

Figure 1-B. Year-to-year probability of exiting asset poverty, 2005 – 2014

Figure 1-C. Year-to-year probability of staying in asset poverty, 2005 – 2014

Table 2.

Summary of Statistics of the Analysis Samples, 2005 - 2014

Variable	Consumption1 (net worth) (n=1,869)			Consumption2 (financial) (n=5,273)			Development (n=2,688)		
	Mean ^a	Min	Max	Mean	Min	Max	Mean	Min	Max
Lag poverty	0.41	0	1	0.54	0	1	0.57	0	1
Poverty in 2005	0.63	0	1	0.67	0	1	0.41	0	1
Home ownership	0.22	0	1	0.53	0	1	0.27	0	1
Productive assets	4.01	0	100	12.45	0	100	9.74	0	100
Ln(Income)	8.88	6.41	10.96	8.96	4.73	11.12	8.88	6.41	10.96
Non-metropolitan residence	0.64	0	1	0.63	0	1	0.61	0	1
Household size	2.38	1	6.5	2.50	1	9	2.18	1	7
Number of workers	0.92	0	3.4	1.08	0	5	0.89	0	4.1
Age	58.40	19	97	59.80	19	97	60.43	19	97
Male	0.59	0	1	0.69	0	1	0.57	0	1
Marital Status									
Married	0.45	0	1	0.59	0	1	0.43	0	1
Divorced/widowed/separated	0.49	0	1	0.36	0	1	0.50	0	1
Single	0.06	0	1	0.05	0	1	0.07	0	1
Education level									
Less than high school	0.59	0	1	0.58	0	1	0.65	0	1
High school graduation	0.27	0	1	0.27	0	1	0.23	0	1
College or higher	0.14	0	1	0.15	0	1	0.13	0	1
Employment type									
Permanent worker	0.13	0	1	0.16	0	1	0.12	0	1
Unemployed	0.46	0	1	0.40	0	1	0.46	0	1
Temporary worker	0.25	0	1	0.19	0	1	0.21	0	1
Self-employed	0.16	0	1	0.26	0	1	0.21	0	1

Note. ^a All variables are measured as mean value within households between 2005 and 2014.

Table 3.

Average Marginal Estimates (AMEs) on Probability of Asset Poverty

Variable	Consumption1 (net worth) (n=9,450)	Consumption2 (financial) (n=33,196)	Development (n=13,773)
Lag poverty	.14*** (.01)	.14*** (.01)	.20*** (.01)
Poverty in 2005	.00 (.01)	.04*** (.01)	.06*** (.01)
Home ownership	-.32*** (.03)	.01 (.01)	-.37*** (.02)
Mean home ownership	.04 (.03)	-.15*** (.02)	.03 (.02)
Productive assets	-.01*** (.00)	.00 (.00)	.002*** (.00)
Mean productive assets	.002** (.00)	-.002*** (.00)	-.003*** (.00)
Ln(Income)	-.13*** (.01)	-.17*** (.01)	-.13*** (.01)
Mean ln(income)	.02 (.03)	-.10*** (.01)	-.03 (.02)
Non-metropolitan	.03 (.06)	-.06 (.04)	-.15** (.05)
Household size	.03* (.01)	.01 (.01)	-.05*** (.01)
Number of workers	-.01 (.01)	-.05*** (.01)	-.01 (.01)
Post-crisis	-.09*** (.01)	-.02*** (.02)	-.06*** (.01)
Age of under 40	-.07* (.03)	-.03 (.02)	-.01 (.03)
Age over 60	.04 (.03)	.02 (.01)	.01 (.02)
Male	-.01 (.04)	-.02 (.02)	-.02 (.02)
Divorced/widowed/separated	-.01 (.03)	-.03 (.02)	.04 (.02)
Single	.01 (.06)	-.04 (.03)	.04 (.04)
High school	.10* (.04)	-.02 (.03)	.02 (.03)
College or higher	.10 (.06)	-.02 (.04)	.05 (.05)
Unemployed	.00 (.03)	-.03 (.02)	.00 (.02)
Temporary worker	.03 (.02)	.03* (.01)	.01 (.02)
Self-employed	-.05 (.03)	.02 (.02)	.02 (.02)

Note. Standard errors are reported in parentheses. AMEs for time-averaged means are not reported except home ownership, productive assets, and disposable income. See appendix B2 for the coefficient; * $p < .05$.

** $p < .01$. *** $p < .001$.

Appendices A

Table A1.

National Minimum Living Standard (MLS), 2005 - 2014

Year	Number of household members					
	One	Two	Three	Four	Five	Six
2005	401	669	908	1,136	1,303	1,478
2006	418	701	940	1,170	1,353	1,542
2007	436	734	973	1,206	1,405	1,610
2008	463	784	1,027	1,266	1,488	1,712
2009	491	836	1,081	1,327	1,572	1,817
2010	504	858	1,110	1,363	1,615	1,867
2011	532	906	1,173	1,439	1,705	1,971
2012	553	942	1,218	1,495	1,772	2,048
2013	572	974	1,260	1,546	1,832	2,118
2014	603	1,027	1,329	1,630	1,932	2,234

Note. Figures are reported as USD; Korean won values are converted into US dollar values by employing the foreign currency exchange rate of 1:1,000 (USD: KRW).

Table A2.

Down Payment (10%) of Median Housing Prices, 2005 - 2014

Year	Metropolitan area	Non-metropolitan area
2005	20,998	10,092
2006	22,966	10,312
2007	27,417	10,434
2008	30,651	10,613
2009	31,543	10,691
2010	31,279	11,140
2011	31,223	12,299
2012	31,136	12,856
2013	29,739	12,971
2014	30,109	13,381

Note. Figures are reported as USD; Korean won values are converted into US dollar values by employing the foreign currency exchange rate of 1:1,000 (USD: KRW).

Appendix B

Table B1.

Coefficient on Probability of Asset Poverty

Variable	Consumption1 (net worth) (n=9,450)	Consumption2 (financial) (n=33,196)	Development (n=13,773)
Lag poverty	0.46 (0.04)	0.45 (0.02)	0.87 (0.04)
Poverty in 2005	0.00 (0.05)	0.12 (0.02)	0.26 (0.05)
Home ownership	-1.07 (0.09)	0.03 (0.04)	-1.58 (0.08)
Mean home ownership	0.12 (0.11)	-0.47 (0.05)	0.13 (0.11)
Productive assets	-0.02 (0.00)	0.00 (0.00)	0.01 (0.00)
Mean productive assets	0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00)
Ln(Income)	-0.45 (0.05)	-0.53 (0.02)	-0.54 (0.04)
Mean ln(income)	0.06 (0.08)	-0.30 (0.04)	-0.14 (0.08)
Non-metropolitan	0.10 (0.21)	-0.19 (0.11)	-0.61 (0.19)
Household size	0.09 (0.04)	0.02 (0.02)	-0.19 (0.04)
Number of workers	-0.02 (0.04)	-0.16 (0.02)	-0.05 (0.04)
Post-crisis	-0.31 (0.04)	-0.08 (0.02)	-0.26 (0.03)
Age of under 40	-0.07 (0.03)	-0.03 (0.02)	-0.01 (0.03)
Age over 60	0.04 (0.03)	0.02 (0.01)	0.01 (0.02)
Male	-0.04 (0.12)	-0.08 (0.07)	-0.10 (0.11)
Divorced/widowed/separated	-0.04 (0.11)	-0.10 (0.06)	0.16 (0.10)
Single	0.02 (0.20)	-0.12 (0.11)	0.15 (0.17)
High school	0.34 (0.15)	-0.05 (0.08)	0.08 (0.15)
College or higher	0.35 (0.22)	-0.07 (0.11)	0.23 (0.22)
Unemployed	0.01 (0.09)	-0.08 (0.05)	-0.01 (0.09)
Temporary worker	0.08 (0.07)	0.10 (0.04)	0.03 (0.07)
Self-employed	-0.19 (0.09)	0.06 (0.05)	0.10 (0.09)

Note. Standard errors are reported in parentheses. Coefficients for time-averaged means are not reported except home ownership, productive assets, and disposable income.

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