The Condition of Asset Poverty and the Impact of an Asset-based Intervention in South Korea

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# Preface

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## English Abstract

**Background:** In recent years, scholars and stakeholders around the world have questioned whether income transfers alone can effectively mitigate poverty and inequality. In response to these concerns, in Korea as well as in other countries, asset-based interventions have been initiated to complement traditional income-transfer programs. Although various asset-building programs have been implemented in Korea since 2007, these programs were developed without a consensus on the definition of assets and asset poverty, and without a thorough understanding of the actual conditions of the asset poor in the Korean context. This lack of understanding has led to logical contradictions embedded in the asset-based policy itself, and has limited the effectiveness of policy implementations. This dissertation aims to fill multiple gaps in the scholarly research on asset poverty and propose a direction for more effective asset-based antipoverty strategies in Korea. It is divided into three complementary studies. In the first, I measure the dynamics of asset poverty using longitudinal panel data from the last ten years (2005 to 2014). In the second, I test the association between asset poverty and material hardship. In the third, I estimate the impact of participation in Korea's nation-wide asset-building program, the Hope Growing Account (Hope), on household economic well-being between 2010 and 2012. Methods: I used three different data sources and four different analytical models for this dissertation. The primarily data source is the Korean Welfare Panel Study (KOWEPS), a longitudinal panel dataset annually conducted since 2006. The other two data sources are the Hope panel study established by Choi, Han, Choi, and Park (2010) and administrative data on Hope participants' earned income gathered by the Korean Ministry of Health and Welfare (KMOHW). The four models used in this analysis are the dynamic panel model of discrete choice (study 1), the binary logistic regression model (study 2), propensity score matching (PSM), and the difference-in-differences (DID) model (study 3).

**Results:** Findings reveal that asset poverty in Korea was structurally persistent for the decade studied (2005 to 2014), and the asset poor were more vulnerable to material hardship than estimated by the income poverty measure. Asset-building programs (as distinct from income transfer programs) have gained attention as a way to mitigate poverty over the long term, and this dissertation found that the Hope asset-building program in Korea helped some but not all participants increase earnings and improve their poverty status over the period studied (2010 to 2012).

**Conclusions and Implications:** The findings from this dissertation have policy and research implications for the field of social welfare. To address the condition of asset poverty, I suggest that a progressive asset-based policy including social insurance and a public assistance program should be implemented in Korea to enhance home ownership and complement the existing social security system. To empirically support the creation of new, more effective policies, future research should examine the extent of asset poverty reproduction across generations in Korea, and other potential long-term treatment impacts of asset-based intervention such as changes in asset ownership, civic engagement, and behavior.

#### French Abstract

**Contexte :** Depuis quelques années, les chercheurs et les intervenants du monde entier se demandent si les transferts de revenus peuvent, à eux seuls, atténuer efficacement la pauvreté et les inégalités. En réponse à ces préoccupations, la Corée et d'autres pays proposent des interventions fondées sur les actifs en complément des programmes traditionnels de transfert de revenus. Bien que divers programmes d'accumulation d'actifs soient en place depuis 2007 en Corée, ces programmes ont été élaborés sans qu'il y ait consensus en ce qui concerne la définition d'actifs et de pauvreté par manque d'actifs et sans bien comprendre les conditions actuelles des personnes pauvres par manque d'actifs dans le contexte coréen. Ce manque de compréhension est à l'origine de contradictions logiques dans la politique même d'accumulation d'actifs et entrave l'efficacité de la mise en œuvre de politiques. Cette thèse vise à combler les nombreuses lacunes des travaux de recherche portant sur la pauvreté par manque d'actifs et propose une orientation pour des stratégies plus efficaces de lutte contre la pauvreté fondées sur les actifs en Corée. La thèse se divise en trois études complémentaires. Dans la première étude, je mesure la dynamique de la pauvreté par manque d'actifs à l'aide de données de panel longitudinales des dix dernières années (de 2005 à 2014). Dans la deuxième étude, j'examine le lien entre la pauvreté par manque d'actifs et les difficultés d'ordre matériel. Dans le troisième, j'évalue l'impact de la participation à un programme national d'accumulation d'actifs en Corée, le Hope Growing Account (Hope), sur la prospérité économique des foyers entre 2010 et 2012. Méthodologie : Trois sources de données différentes et quatre modèles analytiques différents ont été utilisés pour cette thèse. La principale source de données est la Korean Welfare Panel Study (KOWEPS), un ensemble de données longitudinales recueillies annuellement depuis 2006. Les autres sources de données sont l'étude par panel Hope, instaurée par Choi, Han, Choi et Park (2010), et les données administratives sur les revenus gagnés par les participants de l'étude

HOPE recueillies par le ministère de la Santé et de la Protection sociale de la Corée (KMOHW). Les quatre modèles utilisés pour l'analyse sont le modèle dynamique de choix discrets (étude 1), le modèle de la régression logique binaire (étude 2), le modèle de l'appariement des coefficients de propension (ACP) et le modèle des doubles différences (MDD) (étude 3).

**Résultats :** Les résultats révèlent que la pauvreté par manque d'actifs en Corée était structurellement chronique pendant la décennie à l'étude (2005 à 2014) et que les personnes pauvres par manque d'actifs étaient plus vulnérables aux difficultés d'ordre matériel que ne l'indiquait la mesure de pauvreté du revenu. Les programmes d'accumulation d'actifs (distincts des programmes de transfert de revenus) ont retenu l'attention comme façon d'atténuer la pauvreté à long terme. Cette thèse fait le constat que le programme Hope d'accumulation d'actifs en Corée a aidé certains des participants, mais pas tous, à augmenter leurs revenus et à améliorer leur niveau de pauvreté au cours de la période à l'étude (2010 à 2012).

**Conclusions et implications :** Les résultats de cette thèse ont des implications politiques et en matière de recherche dans le domaine du travail social. Pour améliorer les conditions de pauvreté par manque d'actifs, je suggère qu'une politique progressive d'accumulation d'actifs comprenant un programme public d'assurance sociale et d'aide sociale soit élaborée en Corée pour accroître l'accès à la propriété, en complément du système de sécurité sociale actuel. Pour soutenir de façon empirique la création de politiques nouvelles et plus efficaces, de futures recherches devraient examiner l'ampleur de la reproduction de la pauvreté par manque d'actifs en Corée de génération en génération, ainsi que d'autres effets potentiels à long terme des interventions fondées sur des actifs comme des changements dans la propriété des actifs, l'engagement civique et les comportements.

## Chapter 1

Until the late 1990s, South Korea enjoyed a more equal income distribution than that of other advanced economies, including the US and UK, despite weaknesses in its social security system. Despite some fluctuations, the economy of South Korea (hereafter "Korea") boomed from the late 1960s to the mid-1990s (per-capita Gross Domestic Product [GDP] increased US\$1,078 in 1960 to \$13,254 in 1996), and the absolute income poverty rate dropped significantly from 40.9% in 1965 to 3.8% in 1996, at which time poverty affected only a small minority of mostly elderly people (Ku, 2004). However, following the Asian Financial Crisis of 1997, Korea's absolute poverty rate<sup>1</sup> 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 to this rise in poverty, in 2000 the Korean government introduced the new means-tested income transfer program called the National Basic Livelihood Security (NBLS) system. Unlike the earlier public assistance program that it replaced, the NBLS included people capable of working among its beneficiaries (Choi & Choi, 2007). The government simultaneously established the national minimum living standard (MLS) as Korea's official poverty threshold and the basis for NBLS benefits calculations. The national MLS is adjusted for family size and updated annually according to changes in the Consumer Price Index (CPI). In contrast to the U.S. poverty threshold, which is based on the annual cost of a minimal adequate diet, the Korean MLS is calculated based on the

<sup>&</sup>lt;sup>1</sup> To estimate the poverty rate, Korean research has applied either disposable income or ordinary income. Disposable income is income after deducting taxes and other mandatory charges; ordinary income is composed of income and public transfers (pension and government subsidies) before taxes and mandatory charges such as social security contributions (Jung & Lee, 2015).

minimum cost of 11 necessities including food, shelter, and utilities (Kim et al., 2013). In 2014, the MLS for a family of four was approximately US\$1,630<sup>2</sup> per month.

The Korean government rapidly increased public spending on the NBLS from \$2.8 billion in 2000 to \$12.5 billion in 2011. Adding to the expansion of health and pension insurance, public social expenditures (including social insurance and social assistance payments) in Korea increased from 3.6% to 10.4% of GDP between 1997 and 2014 (Koh et al., 2013; Organization Economic Cooperation Development [OECD], 2016). Despite these policy efforts and the economic recovery of the early 2000s, poverty has remained an important issue in Korea. For example, the relative income poverty rate (measured as 50% of the median disposable income) has been increasing not only for historically impoverished groups such as femaleheaded households (20.9% in 1999 to 21.9% in 2011) and elderly individuals (16.9% in 1999 to 25.7% in 2011), but also for the working poor<sup>3</sup> (9.5% in 1999 to 11.1% in 2011; Kim et al., 2012; Noh, 2013). Empirical studies have also found that although income transfer programs resulted in a slight reduction in poverty in Korea, the effectiveness of these programs was only one-seventh to one-tenth that of similar programs in western countries (Choi & Choi, 2007). Many stakeholders have therefore raised questions as to whether income transfers alone can effectively mitigate poverty and inequality in Korea.

These controversies surrounding the economic and redistributive effects of income transfers inspired national discussions on asset-based policies in Korea. Asset-based policies offer an alternative to Korea's current income-based anti-poverty policies. This dissertation

<sup>&</sup>lt;sup>2</sup> All Korean Won values ( $\mathbb{H}$ ) in the present study are converted into US dollar values by employing the foreign currency exchange rate of 1:1,000 (US dollar: Korean Won). The lowest exchange rate was 711 and the highest one was 1,404 won per dollar between 1990 and 2016.

<sup>&</sup>lt;sup>3</sup> There is no universally accepted definition of the working poor. For this study, the working poor can be broadly defined as a group of people in society who are working but whose household income falls below the poverty threshold (Crettaz, 2013; Noh, Hong, Choi, Jun, & Park, 2009).

intends to help us better understand the possibilities for asset-based policies to address poverty conditions in Korea.

#### The Importance of Assets

Decades of research and experience with anti-poverty programs have revealed that there is more to poverty than simply maintaining a certain income level. Income measurements alone cannot capture the multidimensional nature of poverty, which includes food, health, education, human rights, and security (Atkinson, 2003; Sen, 1979; Townsend, 1979). Although income is a straightforward, simple, and transparent measure, assets, while more complex, can provide a better understanding of the multidimensional conditions of poverty (Nam, Huang, & Sherraden, 2008). Since there are many varieties of "assets" (and definitions vary), one difficulty is determining what and how to measure a cut-off or threshold for low assets. Sherraden (1991), for instance, broadly defined assets as stores of wealth and divided them into two categories: *tangible* and *intangible*. Tangible assets include money savings, stocks, bonds and other financial securities, real property, automobiles, jewelry, art, collectibles, machines and equipment, durable household goods, and natural resources; intangible assets include access to credit, human capital, cultural capital, formal and informal social capital, and political capital.

While income supports daily existence in the form of shelter, food, clothing, and other necessities, assets function as a storehouse of a household's economic resources. When combined with income, assets enable households and individuals to invest in education, business, training, health, and comfort (Shapiro, 2001; Sherraden, 1991). In light of this, assets are a special form of money used to create opportunities and achieve a desired life. Thus, while the main purpose of income support policy is to maintain a basic standard of living, asset-based policy aims to provide a foundation for future individual growth and well-being along multiple

dimensions (Sherraden, 1991). By reviewing empirical research, Lerman and McKernan (2008) illustrated that the effects of asset accumulation include economic well-being (e.g., income, assets, and consumption), social well-being and civic engagement (e.g., household stability, social capital, and political interest), child well-being (e.g., education attainment, behavioral outcomes, and future asset building), and health and psychological well-being. To these ends, anti-poverty strategy around the world has been expanded to include asset-based policies as a complement to the traditional income support policies (Sherraden, 2005).

To employ asset-based intervention as an anti-poverty strategy, it is important to begin with a comprehensive conceptual framework and deep understanding of "assets" and "asset poverty." Yet these are lacking in the Korean context. Although a nation-wide asset-building program was initiated in Korea in 2007, research on asset poverty did not begin until more recently (Kim & Kim, 2013). Korea's asset-based policies including the *Didim Seed Account program* and the *Hope Growing Account (Hope) program* were established without a consensus on the definition of assets and asset poverty, and without a thorough understanding of the actual conditions of the asset-poor. This lack of understanding has led to logical contradictions embedded in the policy itself, and has limited the policy's effectiveness (Kim & Kim, 2013; Shapiro, 2001).

# **Study Aims**

My dissertation aims to fill multiple gaps in the scholarly research on asset poverty and propose a direction for more effective asset-based anti-poverty strategies and policy in Korea. It is divided into three complementary studies. In the first, I measure the dynamics of asset poverty in Korea using longitudinal panel data within the different conceptual frameworks. In the second, I test the association between asset poverty and material hardship. Lastly, I estimate the impact of participation in Korea's nation-wide asset-building program for working poor households, the Hope Program, on household economic well-being. These three studies together also contribute knowledge of East Asia to the Western-based body of knowledge on asset poverty and assetbuilding interventions. In this dissertation, I examine the persistence of asset poverty and the actual living conditions of the asset poor in Korea. Then I estimate the impact of a current assetbased intervention and discuss policy implications for how to address the conditions of asset poverty in Korea.

## **Definition of Assets: Three Different Theoretical Perspectives on Assets**

This section outlines the definitions and roles of assets within three different theories that inform the analytic framework of this dissertation. The three theories are: consumption theory (Ando & Modigliani, 1963; Carroll, Hall, & Zeldes, 1992; Hubbard, Skinner, & Zeldes, 1994), social stratification theory (Shapiro, 2004; Oliver & Shapiro, 1990), and social development theory (Midgley & Sherraden, 2000; Sherraden, 1991).

#### Assets as a resource for future consumption.

Consumption theory defines assets as a storehouse for future consumption following the life cycle and buffer-stock models. The life cycle model (Ando & Modigliani, 1963) and buffer-stock model (Carroll et al., 1992; Hubbard et al., 1994) treat savings as a way of balancing the fluctuation of household financial resources for consumption throughout a lifetime. These models are based on the assumption from the permanent income hypothesis by Friedman (1957): that people make financial decisions to maintain a maximum level of consumption throughout their lifetimes, and thus, current consumption level is determined not by current income but rather by permanent income. In the life cycle model, because forward-looking individuals anticipate that their incomes will fall sharply after their retirement, they accumulate assets when

they are younger and use their savings after retirement so as to maintain a steady level of consumption pre- and post-retirement (Ando & Modigliani, 1963). Accordingly, assets are disproportionally distributed across age groups in a hump-shaped pattern. That is, individuals at the early adult stage (20s-30s) tend to have relative few assets; those in their prime earning years (40s-50s) tend to see their assets grow. Asset accumulation tends to peak in a person's 50s, and then decline in retirement age (in a person's 60s and beyond; Rank & Hirschl, 2010). In the life cycle model, asset holding is associated with certain life cycle states, and people of working age are motivated to save for life after retirement and to invest in housing.

The buffer-stock model is a modified version of the life cycle model and permanent income hypothesis that takes into account income uncertainty. In the buffer-stock model, people save and hold financial assets mainly to shield their consumption level against unpredictable income loss and expenses, such as unemployment or sudden medical costs (Carroll, 1997). In this model, people with less wealth have less ability to buffer their consumption against unexpected changes in income. Empirical evidence shows that buffer-stock saving behavior can be observed over most of the working lifetime until roughly age 45 or 50, and this working-age behavior (until age 45 or 50) resembles the life cycle behavior between age 50 and retirement. Accordingly, while the buffer-stock model better explains the precautionary motives for saving during one's working years, the life cycle model better explains savings for retirement such as participating in a pension plan or buying a house (Carroll, 1997).

# Assets as a vehicle for social stratification.

In contrast to consumption theory, which emphasizes the role of assets as a resource of future consumption, social stratification theory defines assets as a major vehicle for transmitting class status across generations. Classic social theories posit wealth in the form of capital and

property to be a fundamental fault line of social stratification. Karl Marx (1848) viewed ownership of the means of production (a category that includes property) as the essence of class division between bourgeoisie and proletariat. Weber (1958) considered property as one of the important web of resources which promote a set of life chances (Oliver & Shapiro, 1990; Weber, 1958). In his notion, the concept of "class" referred to any group of people having in common a specific causal component of their life chances and "property" and "lack of property" are two of the basic categories of all class situations (Weber, 1958). People who own property compete in the market for highly valued goods, and non-propertied people are excluded from competition in the market (Weber, 1958).

In these classical theories the concept of assets was restricted to inheritance, yet the theories still provide perspective on how wealth structures fundamental social divisions (Shapiro, 2001). Shapiro (2001) built on these classical theories to develop a conceptual framework of assets within their social context structured by history, state policy, public and private institutions, and family financial conditions besides inheritance and earnings. These social contexts promote or inhibit asset acquisition and maintenance across classes and groups, leading to unequal life opportunities for future generations, which are further stratified by wealth passed down through inheritance (Shapiro, 2001, 2004).

#### Assets as a resource for social development.

Another view of assets is provided by the social development model, which conceptualizes assets as a resource to facilitate the investment in the socioeconomic development of individuals. The social development approach was introduced by social welfare researchers and stakeholders as an effort to challenge the dominance of neoliberalism since the early 1990s. In contrast to the neoliberal view that social spending must be reduced because it is a waste of resources and thus harms the economy and decreases global competitiveness, the social development approach sees social spending as a wise and economically beneficial investment (Midgley & Tang, 2001). In short, the social development approach considers welfare programs to be investments in human and social capital, employment, and individual and community asset accumulation (Midgley & Sherraden, 2000; Midgley & Tang, 2001). Unlike traditional welfare services that maintain a particular level of income and expenditure, social investment aims to facilitate the effective participation of welfare clients in the productive economy (Midgley & Tang, 2001). For example, the Individual Development Account (IDA), the most typical assetbased intervention, encourages low and moderate income households to accumulate assets, which enable them to invest in education, home ownership, and businesses (Midgley & Sherraden, 2000; Nam et al., 2008; Sherraden, 1991). Further, asset ownership may change people's attitudes and behaviors, and promote the development of other types of assets (Sherraden, 1991). Therefore, in social development theory, assets are understood to promote individuals' capacities for economic, social, psychological, and political development beyond the mere satisfaction of consumption needs.

# **Measurement of Assets in Existing Research**

The asset measurement developed from the consumption model has been widely used in social work research on assets. In the consumption model, assets are mostly measured by net worth and asset liquidity. Net worth is the difference in value between total marketable assets and total liabilities (or debt; Nam et al., 2008). The most commonly used asset poverty measure within the consumption framework was suggested by Haveman and Wolff (2005), who argued that assets are expected to protect the poor from future risks and temporary income shortfalls.

Based on this assumption, they defined the asset poor as "a household having insufficient assets to enable it to meet basic needs for a period of time" (Haveman & Wolff, 2005, p.149).

Despite the discrepancy in concepts of assets between consumption and social stratification theory, social stratification research has measured assets mostly by net worth and financial assets similar to consumption research. For example, Oliver and Shapiro (1990) measured assets as net worth and net financial assets, and found that assets, especially financial assets, were far more unequally distributed than income across different racial, gender, education, and occupational groups. Social stratification research suggests that the disparity in assets between different groups is passed along from generation to generation, and consequently asset inequality may be translated into class stratification (Nam et al., 2008; Oliver & Shapiro, 1990; Shapiro, 2004).

Social development research has paid particular attention to home ownership, which can provide a variety of life opportunities, stability, and social integration. For example, some empirical studies have found that parents' home ownership improves their children's educational achievement (Green & White, 1997; Scanlon & Adams, 2005; Zhan & Sherraden, 2003). In addition, home ownership may reduce the duration of unemployment. This works through two mechanisms: the burden of monthly mortgage payments motivates the unemployed to more vigorously search for a job, and home equity leads to an increase in labor market mobility and aids people in the job search by cushioning the expenses of job search and reducing future earnings risks (Goss & Phillips, 1997). Other empirical research has found a significant and positive association between home ownership and social capital such as civic engagement (DiPasquale & Glaeser, 1999; Page-Adams & Sherraden, 1997). From the social development perspective, Shapiro, Oliver, and Meschede (2009) suggest the *Asset Opportunity Index*, a measure of asset poverty including an additional amount of economic resources associated with three different types of mobility investment: average expenses for two years at a public university, average down payment for a median priced home, or average start up expense for a business. By applying the Asset Opportunity Index, Shapiro et al. (2009) found that more than half of the U.S. working age population did not have adequate resources to sustain their essential expenses and also educate their child, make a down payment on a home, or start a business.

# **Literature Review**

This section describes the trends, limitations, and policy implications of existing research on asset poverty and asset-based interventions in Korea and the US. It looks at why the problem of asset poverty has emerged as an important issue in Korea, and explains how asset-based interventions have effectively worked to address the poverty conditions of low income and low wealth households. Existing literature on asset poverty contributes to understanding the condition of asset poverty in Korea, but it is insufficient to develop a robust strategy for addressing the challenges of asset poverty.

#### Empirical research on the levels and trends of asset poverty in Korea.

Research on asset poverty in Korea has measured assets mostly by net worth and liquid assets based on the assumption that assets are a storehouse for future consumption. These studies are of two broad types. The first focuses on asset inequality (Kim, 2015; Lee & Lee, 2001; Nam, 2015); the second focuses on defining an asset poverty line by which to measure asset poverty (Kang & Yoo, 2009; Kim & Kim, 2013; Lee, Yi, & Jung, 2011; Lee, Shin, Kim, & Noh, 2005; Suk, 2012) (See Appendix A1 for an overview of major research findings dealing with asset poverty in Korea).

Previous studies on asset inequality show that assets were more unequally distributed than income in Korea. Lee and Lee (2001) compared asset inequality before and after Korea's 1997 financial crisis using the Daewoo longitudinal panel data. They found that during the crisis of 1997, while a large share of the poor experienced an increase in debt, the wealthy experienced an increase in their share of real estate ownership (Lee & Lee, 2001). As a result, the financial crisis of 1997 exacerbated asset inequality, and Korea's Gini coefficient by assets increased from 0.57 in 1996 to 0.66 in 1998. Further, they assumed that asset inequality may be underestimated because of large sample attrition of the data of the top decile in the wealth distribution (Lee & Lee, 2001). Although the Korean economy has recovered since the early 2000s, current research shows that asset inequality remains at such a high level (Kim, 2015; Nam, 2015). Using the Survey of Household Finance and Welfare by the Statistics Korea, Nam (2015) found that the respective Gini coefficients of household disposable income and net worth were 0.43 and 0.60 in 2014. In particular, by using inheritance tax data from the Korean National Tax Service for the last decade, Kim (2015) found that asset inequality was higher when measuring financial assets such as savings, stocks, and bonds than when measuring real estate or housing.

Previous studies on asset poverty also suggest that the condition of asset poverty in Korea has deteriorated over the last decade. To measure asset poverty, some empirical studies have employed a relative asset poverty line such as 50% of median assets (Kang & Yoo, 2009; Lee et al., 2005; Nam & Kwon, 2008). These studies found that asset poverty was persistent over time (Kang & Yoo, 2009) and some households were asset poor despite having an income above the income poverty line (Lee et al., 2005). However, relative asset poverty thresholds are defined

arbitrarily by different researchers and vary in different studies from 40% to 60% of median assets or average assets (Kang & Yoo, 2009; Kim & Kim, 2013; Suk, 2012). This variation in threshold leads to a lack of consistency between findings, and to limitations in any particular study's reliability (Kim & Kim, 2013). In consideration of this problem, others used the absolute asset poverty measure using Haveman and Wolff (2005)'s method based on the amount of assets needed to meet basic needs (Kim & Kim, 2013; Lee et al., 2011; Suk, 2012). For basic needs, studies have employed the national MLS as a threshold. By applying the national MLS as a threshold, Lee et al. (2011) revealed that net worth poverty rate rose from 9.8% in 1999 to 11.1% in 2008, while the income poverty rate declined by 17.3% over the same period. On the other hand, Kim and Kim (2013) considered the official MLS set too low for minimal living standard in Korea, and thus used 120% to 150% of the MLS to estimate asset poverty. Moreover, several studies considering both net worth and liquid assets found that the poverty rate measured by liquid assets was higher than the net worth poverty rate (Kim & Kim, 2013; Suk, 2012). For example, according to Kim and Kim (2013), when considering liquid assets (financial assets and insurance refunds), the level of asset poverty was 32.8 to 36.5%, approximately three times higher than net worth poverty, which was 12.8 to 13.2%. This may be ascribed to the trend among Koreans of converting liquid assets into real estate or housing once liquid assets surpass a certain level (Kim & Kim, 2013; Suk, 2012). Consequently, while housing is the major asset vehicle for most Koreans, liquid financial assets are more densely concentrated among a small portion of the population.

#### Empirical research on the impact of asset-based intervention.

Asset-based intervention suggests that individual, household, and community well-being derives not only from a certain level of income and consumption, but also from the building of

assets to invest in life goals and enhance long-term economic stability and social protections. The most typical asset-based intervention is the IDA program first proposed by Sherraden (1991). In Sherraden's original proposal, IDAs were to be universal and lifelong. The U.S. federal and state governments began to adopt targeted versions of the IDA in the 1990s, and since then the IDA has been implemented in many other countries including the UK, Australia, and Singapore. The IDA originated from social development theory and its main purpose is to encourage low-income households to accumulate assets for their long-term development (Sherraden, 1991).

Since 2007, Korea too has implemented a growing number of targeted asset-based programs. However, because Korea's asset-based interventions are still young, few empirical studies have assessed the impact of the programs (Choi, Han, & Choi, 2011, 2012; Choi, Han, Choi, & Park, 2010; Kim, Lee, & Sherraden, 2012). This section reviews empirical research evaluating the impact of asset-based intervention in the US as well as Korea.

Most empirical studies on the impact of asset-based intervention in the US have focused on the IDA. Previous studies in the US showed that, compared to the general low income population that is eligible for the accounts, the IDA participant population disproportionately consists of females, African-Americans, single individuals, urban residents, higher-educated people, and full-time or part-time workers (Grinstein-Weiss, Yeo, Despard, Casalotti, & Zhan, 2010; Rohe, Gorham, & Quercia, 2005; Schreiner et al., 2005). Most U.S. empirical studies showed that the poor, including welfare recipients and the disabled, can save under structured institutions (Beverly & Sherraden, 1999; Grinstein-Weiss, Zhan, & Sherraden, 2006; Lombe, Putnam, & Huang, 2008). Furthermore, studies showed that IDA participation encourages lowincome households to save regularly (Grinstein-Weiss, Chowa, & Casalotti, 2009; GrinsteinWeiss et al., 2006; Sherraden, Schreiner, & Beverly, 2003). In addition, a few empirical studies have suggested that IDA participation positively changes participants' attitudes and behaviors toward savings and the future (Han & Sherraden, 2009; Loibl, Grinstein-Weiss, Zhan, & Red Bird, 2010; Rohe et al., 2005; Rothwell, Bhaiji, & Blumenthal, 2013).

Despite the various positive effects of IDA, some research has raised questions about the impact of IDA on asset accumulation. For example, based on a review of 18 empirical studies on the effects of IDA, Richards and Thyer (2011) suggest that although most empirical evidence shows that IDA can encourage low income households to save a small amount of money in their IDAs, there is little evidence that IDA leads to increases in total assets. In addition, they found that only four out of 18 studies used a control group consisting of non-IDA participants. Without such a control group, it is difficult to measure whether savings outcomes can be attributed to participation in IDA programs (Richards & Thyer, 2011). Based on their findings, Richards and Thyer (2011) suggest that perhaps IDA participants are simply reallocating their existing assets into IDAs, rather than accumulating more assets because of the IDA. However, to challenge this criticism, some recent research using the two-group experimental design found that IDA participation positively affects participants' non-IDA assets including financial assets and home ownership (Grinstein-Weiss et al., 2013; Han et al., 2009; Huang, 2010; Rothwell & Han, 2010). These findings imply that program participants might not be reshuffling existing assets into IDA accounts and that IDA savings is likely to be new household wealth (Huang, 2010).

# Empirical research on the impact of asset-based intervention in Korea.

Korea has introduced a handful of asset-based interventions that are loosely based on the IDA. First is the *Didim Seed Savings Account*, a nationwide Children Development Account (CDA) targeting institutionalized children, that was initiated in 2007 (Loke & Sherraden, 2009).

Second is the *Hope Plus Account* initiated by the Seoul Metropolitan Government in 2008, an IDA-type account targeting working poor households whose income is under 150% of the national MLS (Han & Kim, 2014). Third is the *Hope program*, a nationwide asset-based intervention introduced in 2010 that is available to households receiving the NBLS whose earned income is more than 60% of the national MLS (Choi, Han, & Choi, 2011; Kim, Zou, Weon, Sherraden, & Choi, 2016). Most recently introduced is the Hope Growing Account II, a nationwide program introduced in 2014 that is available to households who do not receive the NBLS payment and whose income is between 70% and 120% of the MLS (Kim et al., 2016). Preliminary findings indicate that participants in these asset-building programs in Korea are more often female, full- or part-time workers, and high school or college graduates when compared to the general low-income population (Choi et al., 2010; Kim et al., 2012). Further, studies have found that the poor do save under given structured opportunities such as these, and that these asset-building programs contribute to the economic and psychosocial development of the poor, improving their asset accumulation, future expectations, and attitudes toward savings (Choi et al., 2011, 2012; Kim et al., 2012). The fourth chapter of this dissertation discusses these studies in more detail.

# Summary of previous research.

Previous research shows that since the Asian Financial Crisis of 1997, asset poverty has increased in Korea. Empirical research has revealed that since the crisis, assets, in particular liquid financial assets, have been more unequally distributed than income. Furthermore, studies show that basic income support is insufficient to address the poverty conditions in Korea, and suggest that to supplement the income-based policy, the government should expand asset-based interventions such as IDAs and introduce tax reforms.

## Limitations of previous research.

Although existing research into the conditions of asset poverty in Korea provides empirical evidence about the potential of asset-based policies to help low income and low wealth households, it suffers from certain limitations. First, most of the research defines assets as economic resources for future consumption under the life-cycle hypothesis or buffer-stock theory (Kim & Kim, 2013; Lee et al., 2011; Lee et al., 2005; Nam, 2015; Nam & Kwon, 2008). As mentioned previously, the roles and concepts of assets are viewed differently within the three major theoretical frameworks: consumption, social stratification, and social development theories (Nam et al., 2008). Asset poverty research defining assets as exclusively consumption and needs-based does not address the aspect of assets emphasized by social stratification and development theories: generational transfer of class status and the opportunity assets offer for upward mobility (Shapiro, 2004; Shapiro et al., 2009).

Second, previous research in Korea has mostly focused on net worth. Net worth gives a comprehensive picture of all assets and debts, but does not reliably measure the sufficiency of economic resources for future consumption (Oliver & Shapiro, 1990). Most people do not sell their homes for living expenses in the absence of income, and housing must be replaced if sold (Lerman & McKernan, 2008; Rank & Hirschl, 2010). Moreover, in Korea, asset inequality and asset poverty rates are higher when measuring liquid financial assets such as savings, stocks, and bonds than when measuring net worth or real-estate. Measuring asset poverty solely by net worth may therefore overestimate the household stability offered by assets and underestimate poverty (Kim & Kim, 2013; Kim, 2015; Suk, 2012), especially as access to liquid assets has been shown to be an important feature of household economic security (Collins, 2015). Because of this, the asset poverty condition can be better understood by measuring it both by combined net worth

(including financial and housing/real estate assets) to give a total picture, and by financial assets only, to avoid underestimating the condition of asset poverty in Korea.

Finally, most Korean studies have used a cross-sectional approach to estimate asset poverty, but this approach cannot tell us about the persistence of asset poverty. In other words, the cross-sectional approach to asset poverty does not sufficiently explain whether the currently poor are likely to remain poor, or whether the currently non-poor can maintain their position (Carter & Barrett, 2006; Green & Hulme, 2005). Different policies are needed to help people in long-term poverty and those in short-term poverty due to a business cycle or life events (Addison, Hulme, & Kanbur, 2009; Green & Hulme, 2005). For example, if people experience recurrent or persistent asset poverty when controlling for important life cycle event in relation to asset acquisition, policy should examine structural challenges for them and how challenges vary across various classes and groups (Leonard & Di, 2013; Shapiro, 2001). Although there is a study by Kang and Yoo (2009) using the longitudinal panel data to estimate the likelihood of exiting asset poverty in Korea, this study limits itself by considering only net worth and excluding from analysis households who experienced recurrent asset poverty.

# **Research Questions**

This dissertation is organized into a series of three interconnected studies. The first study measures the dynamics of asset poverty in Korea in the last decade. The second study tests the association of asset and income poverty with material hardship. The third study estimates the impact of participation in the asset-based intervention (Hope program) on household economic well-being. I have formulated the following three sets of research questions for this dissertation:

 Research questions for study 1 (Chapter 2): Dynamics of asset poverty in Korea between 2005 and 2014.

- a. How does the probability to incur asset poverty vary by different theoretical and conceptual framework during the last decade, 2005 to 2014?
- b. Is the probability to incur asset poverty persistent over time?
- c. Who are most likely to experience asset poverty at different points in time between 2005 and 2014?
- Research questions for study 2 (Chapter 3): Association between asset poverty and material hardship.
  - a. To what extent is asset and income poverty associated with material hardship?
  - b. How does the association vary according to the form of material hardship considered (food, utility, housing, and health)?
  - c. Who is at risk for material hardship?
- Research questions for study 3 (Chapter 4): Impact of the Hope program on participants' economic well-being.
  - a. To what extent does the Hope program impact participants' household monthly income?
  - b. To what extent does the Hope program impact participants' income poverty status?
  - c. Which Hope participants benefit the most?

d. To what extent does the sample attrition influence the impact of the Hope program? In the conclusion I summarize the findings from these studies and discuss how they contribute to existing knowledge on the condition of asset poverty and asset-based intervention in Korea. Furthermore, I suggest policy implications for developing asset-based interventions as a complement to income-based policies to mitigate the poverty condition in Korea over the longterm.

#### Chapter 2

# **Dynamics of Asset Poverty in Korea**

## Abstract

This study examines the dynamics of asset poverty in Korea using the longitudinal panel data from the last ten years (2005 - 2014). The main goal of this study is to reveal which groups of poor people in Korea have been structurally trapped in poverty and unable to take advantage of new economic opportunities over the last decade. Considering that various definitions of assets may lead to different understandings of assets and policy implications, I used three asset poverty lines that defined assets as resources for either future consumption or socioeconomic development. For each poverty line, 1,869 to 5,273 households who experienced asset poverty for at least one year during the observation period (2005 - 2014) were analyzed. Using the dynamic panel model of discrete choice, this study revealed three main findings: (a) previous asset poverty experience played a statistically significant role in explaining the probability to incur asset poverty for the decade studied in all analysis samples; (b) asset poverty was most persistent when defining assets as a resource for development and life opportunities; and (c) the probability of incurring asset poverty decreased with home ownership, higher disposable income, and greater diversification of the household portfolio. These findings suggest that the asset poor are likely to fall into structural and persistent poverty over time. I describe how future research should study the duration of asset poverty to complete a comprehensive picture of the asset poverty condition. Future research is also needed to examine the extent of asset poverty reproduction across generations in Korea. In terms of policy, asset-based interventions are needed to improve the asset poverty status of households. In addition, policy makers and researchers should consider alternative measures of poverty based on not only income but also the assets at a household's disposal.

Until recently, most poverty research in Korea was characterized by two features: income and cross-sectional measures. While the understanding of the prevalence and correlates of poverty have rapidly expanded, these poverty measures suffer from certain limitations. First, income measurement alone cannot reflect the overall living conditions, which can include other resources such as assets, consumption, expenditure, education, and health. Second, crosssectional measures lack any ability to gauge changes in poverty status.

In response, the first study of this dissertation examines the dynamics of asset poverty in Korea using longitudinal panel data from the last ten years (2005 - 2014). This study intends to reveal which groups of poor people in Korea have been structurally trapped in poverty and unable to take advantage of new economic opportunities over the last decade.

# **Background Studies**

In this section, I discuss the limitations of income and cross-sectional measures. These limitations are the reasons why asset measures and longitudinal approaches have emerged as new methods in poverty research. I then describe the theoretical framework for asset poverty measures, and empirical evidence on the dynamics of asset poverty around the world including Korea.

## Income poverty measurement.

Traditional income poverty research using cross-sectional survey identifies the people as below or above the official poverty line. It provides a numerical distance from the poverty line, in terms of income short-fall, and insightful knowledge about the marginal conditions of the income poor (Brady, 2003; Sen, 1976). For example, it allows us to check whether someone's income falls short of a minimum cost of living, and examine how much welfare benefits he or she needs to receive (Sen, 1979). This research also shows us that income poverty is attributed to individual-level characteristics such as gender, race, age, employment status, and family type, as well as country-level factors such as income growth, unemployment rate, and labor market policy (Brady, Fullerton, & Moren Cross, 2010; Iceland, 2003; Ku, 2004). However, cross-sectional measures are of limited use for understanding important features of poverty, such as who transitions in and out of poverty.

A longitudinal panel survey that offers repeated observations over time on a single cohort of individuals or households is therefore preferred over cross-sectional data to answer complex questions. Using longitudinal panel survey, it is possible to classify the poor as persistently poor, transiently poor, or not poor. Previous research in the US and Korea on the dynamics of income poverty has shown that the bulk of the income poor were poor for only a short period, and managed to raise their incomes above the official poverty line. It suggests that only a small number of households with particular characteristics (e.g., individuals with serious work disabilities, female-headed households with many children, and racial minorities) suffer persistent income poverty (Bane & Ellwood, 1986; Ku, 2005; Lee, Lee, & Kim, 2006; Rank & Hirschl, 1999).

However, estimating poverty by income measures 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 living conditions, including assets, health, consumption, expenditures, and more broadly, functioning and capabilities, did not change (Baulch & Hoddinott, 2000; Sen, 1979). Consider a situation where a household that suffered a temporary income shock and fell into poverty would be expected to remain in its pre-shock living conditions (or to recover quickly to that level) if their assets were not degraded. On the other hand, a household that suffered a loss of income and assets might indeed be more likely to experience chronic poverty. As a result, to address the limitations of income and cross-sectional measures, some scholars argue for the asset measures using a longitudinal approach as a new method in poverty research (Carter & Barrett, 2006; Rank & Hirschl, 2010).

# Asset poverty measurement.

A focus on assets provides important information about the structural foundations of poverty because it accounts for overall living conditions. The advantage of asset poverty measures over income poverty measures is that it accounts for the functions that assets can serve beyond the provision of immediate consumption needs. As discussed in the first chapter of this dissertation, the roles and concepts of assets are viewed differently within the different theoretical frameworks, and thereby the asset poverty measure varies depending on which concept of assets is used. This leads to different understandings of the condition of asset poverty and policy implications.

## Asset poverty measure from the consumption perspective.

Consumption theory considers assets as a storehouse for future consumption. From this perspective, Haveman and Wolff (2005) defined the asset poor as 'a household with insufficient assets to enable it to meet basic needs for a period of time' (p.149). More specifically, to measure basic needs, they used the family-size conditioned poverty threshold proposed by the U.S. National Academy of Sciences panel, 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).

The asset poverty measure based on consumption theory contributes to understanding how long a household can survive when income streams are disrupted by sickness, unemployment, or retirement. In particular, having financial resources is important because most people cannot sell their homes to maintain their basic consumption in the absence of income (Wolff, 1990). Policies addressing this problem include subsidized savings programs such as Individual Retirement Accounts (IRAs) in the US and Unemployment Insurance Savings Accounts (UISAs) in Chile. These programs can provide asset-building opportunities to low wealth individuals and households during periods of work in the labor market that help them overcome periods of low or no income such as retirement and unemployment.

#### Asset poverty from the development perspective.

Social development theory defines assets as a resource for investing in opportunities for upward mobility beyond maintaining consumption needs. Although social development research has often relied on asset poverty measures developed by the consumption model, some recent research suggests alternatives to reflect the discrepancy in the concept of assets between the two theories. For example, Nam, Huang, and Sherraden (2008) suggest 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 an additional amount for economic resources that enable investment in opportunities for mobility beyond mere economic security. The amount is associated with 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). These asset poverty measures by Nam et al. (2008) and Shapiro et al. (2009) were 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). The asset poverty measure based on the social development model can be used to ascertain whether a household has the asset capacity required for activities that would improve their economic mobility, such as education, home ownership, or business start-up.

In sum, the condition of asset poverty and how to address it can differ depending on how assets are conceived within different theoretical frameworks. Considering these differences, in the present study I measure asset poverty with both the consumption and social development approaches.

#### Dynamics of asset poverty.

It has become clear that risk for asset poverty persists throughout a person's life. Previous research on asset poverty dynamics suggests that the asset poor are likely to remain trapped in asset poverty over the long-term (Kang & Yoo, 2009; Leonard & Di, 2013; Rank & Hirschl, 2010; Zimmerman & Carter, 2003). Considering the dearth of Korean research on this topic, this section reviews empirical research on the dynamics of asset poverty in other countries including the US as well as Korea. To my knowledge, Kang and Yoo (2009) is the only empirical research on the dynamics of asset poverty in Korea using longitudinal panel data. In addition, empirical evidence on unequal asset distribution (especially financial assets) in the two countries implies that U.S. and Korean capitalism have not effectively distributed assets among their populations.

Empirical research shows that the occurrence of asset poverty is not fully explained by the life cycle model. By using the Panel Study of Income Dynamics (PSID) data from 1984 to 2004, Rank and Hirschl (2010) found that asset poverty was most prevalent among young adults, but was seen in all age groups. In particular, when applying financial assets (e.g., farm and business assets, stock, bonds, and savings) and liquid assets, individuals of prime age (40s - 50s) were quite likely to encounter the risk of asset poverty (Rank & Hirschl, 2010). This finding is inconsistent with the expectation from the life cycle model that young adults (20s - 30s) have a higher asset poverty rate than adults in their prime (40s - 50s; Ando & Modigliani, 1963).

An important part of understanding poverty is estimating the likelihood that current poverty will lead to future poverty. Knowing this tells us whether the currently poor are likely to remain poor over the long-term and structurally be caught in a poverty trap. By analyzing the PSID data from 1984 through 1999, Caner and Wolff (2004) found that around 60% of those experiencing net worth poverty in one survey year were still the net worth poor five years later. Persistence was higher (around 70%) when excluding home equity from net worth in the definition of assets (Caner & Wolff, 2004). By using the PSID data from 1999 through 2007, Leonard and Di (2013) found that among households that exit asset poverty, those who had a longer history of asset poverty prior to exiting were more likely to reenter 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. 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.

## Dynamics of asset poverty in Korea.

In Korea, empirical evidence suggests that asset poverty is more persistent over time than income poverty. Kang and Yoo (2009) measured asset poverty as 50% of median net worth using the Korean Labor and Income Panel Study (KLIPS) of 1999 and 2005. They found 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. Furthermore, households whose heads were elderly, highly educated, permanent workers, and worked in business or administration were more likely to exit asset poverty than other people (Kang & Yoo, 2009). Given these findings, Kang and Yoo (2009) suggest that asset-based intervention should be expanded in Korea to provide structured opportunities for low income and low wealth households to accumulate assets.

## Limitations of previous research.

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 are one example: they were not considered in Kang and Yoo (2009)'s study of the dynamics of asset poverty in Korea. Considering some previous research (e.g., Caner & Wolff, 2004; Leonard & Di, 2013, Rank & Hirschl, 2010) revealed that asset poverty is more persistent when measured by financial assets compared to applied net worth, the study by Kang and Yoo (2009) does not provide a complete estimation of the persistence of asset poverty in Korea.

#### **Research Questions**

I build on exiting literature and contribute to the understanding of asset poverty in Korea in at least two ways. First, the present study uses multiple definitions of assets to provide a more complete picture of the relationship between assets and household economic conditions. Next, while most previous asset poverty research in Korea has relied on the cross-sectional approach, the present study examines the dynamics of asset poverty in Korea using ten years of longitudinal panel data. The present study is guided by the following questions: (a) How does the probability to incur asset poverty vary by different theoretical and conceptual framework (i.e., consumption and development theory) during the last decade, 2005 to 2014? (b) Is the probability to incur asset poverty persistent over time? (c) Who are most likely to experience asset poverty at different points in time between 2005 and 2014?

## Method

## Sources of data.

The data came from the Korean Welfare Panel Study (KOWEPS) between 2005 (1<sup>st</sup> wave) and 2014 (10<sup>th</sup> wave). The KOWEPS is 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 data are publicly available on the KOWEPS website (https://www.koweps.re.kr:442/main.do). Since it is the largest national panel data in Korea on this topic and predominantly consists of low income households, the KOWEPS is widely used in Korean poverty research (Kim & Kim, 2013). The KOWEPS provides details on household socio-demographics, assets, debts, income, material hardship, and welfare needs. While some information such as health condition, employment status, and income is collected about all individuals in a household unit, the greatest level of detail is collected for the primary adults heading a household unit (Noh et al., 2015). 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 1<sup>st</sup> wave surveyed in 2006, stock variables (e.g., assets) were measured on December 31<sup>th</sup>, 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 design. 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 (10<sup>th</sup> wave), the retention rate of the original sample was nearly 67.31% (4,760 households). Table 1 shows the retention rate relative to the original sample and sample size (Noh et al., 2015). In the KOWEPS, members of the original households are followed if they form or join new households; these added households form a new sample group. In addition, to make up for sample attrition, 1,800 new households were added to the sample with the 7<sup>th</sup> wave.

#### Table 1.

Cumulative Retention	n Rate and Sample	Size by	Waves o	f the Korean	Welfare	Panel Study	(KOWEPS)
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Waves	Original sample retention rate	Original sample	Newly entered household <sup>a</sup>	Newly added sample group <sup>b</sup>	Total sample
1st wave (2005°)	100.00%	7,072	-	-	7,072
2nd wave (2006)	92.07%	6,511	69	-	6,580
3rd wave (2007)	86.65%	6,128	186	-	6,314
4th wave (2008)	83.92%	5,935	272	-	6,207
5th wave (2009)	80.25%	5,675	359	-	6,034
6th wave (2010)	75.44%	5,335	400	-	5,735
7th wave (2011)	74.53%	5,271	461	-	5,732
8th wave (2012)	72.17%	5,104	515	1,693 <sup>d</sup>	7,312
9th wave (2013)	69.23%	4,896	542	1,610	7,048
10th wave (2014)	67.31%	4,760	583	1,571	6,914

*Note.* Sample size is measured by the number of households. Adapted from "2015 Korean Welfare Panel Study," by D. M. Noh et al., 2015, KIHASA Policy Report No. 2105-35, p.8. Copyright 2015 by the KIHASA.

<sup>a</sup> Including households newly entered because of change in marital status or family split. <sup>b</sup>Newly added sample group since the 7<sup>th</sup> wave. <sup>c</sup> The data was collected in 2006, but the survey asked about information of the prior year, 2005. <sup>d</sup> Among 1,800 households that was newly added to the sample with the 7<sup>th</sup> wave, 1,693 households were surveyed in the 8<sup>th</sup> wave.

My 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

analysis. 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.

### Measurement.

## Measurement of asset.

As mentioned in the first chapter, previous research on asset poverty has often measured asset poverty by applying either net worth or financial assets. I defined net worth as the difference in value between total marketable assets and total debt. Specifically, total marketable assets include real property (owner-occupied housing, residence deposit, and other real estate), hard assets (e.g., vehicle, jewelry, art, and collectibles), and financial assets (e.g., 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 (Kim & Kim, 2013; Statistics Korea, 2015b). All absolute values were reported in constant US dollars (1:1,000 = USD: KRW).

## Dependent variable: asset poverty.

In the present study, I defined and measured asset poverty within consumption and social development frameworks. For consumption theory, I used the most widely used asset poverty measure defined by Haveman and Wolff (2005). To use their concept, I needed to define three key components in the Korean context: (a) basic needs, (b) period of time, (c) wealth type resources. To begin with, I used Korea's official absolute poverty threshold, the national minimum living standard (MLS), to measure 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 scale (Kim et al., 2013). In the present study, I applied 150% of the MLS for the correct household

size each year. Because the MLS level is insufficient to reflect actual living conditions, 120% or 150% of the MLS has been widely used as the poverty threshold in Korean poverty research (e.g., Kim, Ra, & Ryu, 2013; Kim & Kim, 2013; Lee & Ban, 2009). Thus, applying 150% of the MLS may facilitate the comparison of findings with other research. The raised threshold also has been widely employed in policy to determine welfare program eligibility (Noh, Hong, Choi, Jun, & Park, 2009). For example, the matched savings programs in Korea (the Hope Growing Account and Hope Plus Account programs) use 150% of the MLS to determine income eligibility. Next, I stipulated the period of time as three months, following Haveman and Wolff (2005). Some Korean research using Haveman and Wolff (2005)'s concept (e.g., Kim & Kim, 2013; Lee et al., 2011) also defined the limited period of time as three months. This is based on the consideration that, in Korea, credit card bills and public utility charges are allowed to be overdue for a maximum of three months (Kim & Kim, 2013). Lastly, I applied both net worth and financial assets as potential consumption resources to create two asset poverty indicators. I called these indicators as "Consumption 1 (net worth)" and "Consumption 2 (financial assets)." While net worth gives a comprehensive picture of all assets and debts, financial assets can be a more clear-cut resource that is easily monetized during a personal financial crisis (Rank & Hirschl, 2010; Shapiro et al., 2009).

From a social development perspective, I measured asset poverty by the 'minimum amount of assets necessary to achieve home ownership,' referring to Nam et al. (2008) and Shapiro et al. (2009). This asset poverty measure was used by Shapiro et al. (2009) to estimate asset poverty in the US. However, to my knowledge, the present study is the first to estimate asset poverty in Korea within the social development theoretical framework. Although this asset poverty concept was proposed in the U.S. context where home ownership represents part of the American Dream, it can be applied to the Korean context where people mostly accumulate assets through home ownership. In Korea, 80.4% of total household assets take the form of owneroccupied housing, real estate, and residence fixed deposit (Statistics Korea, 2015b). In addition, in Korea, around 60% of households live in their own homes (Kang et al., 2014). While Shapiro et al. (2009) operationalized assets as net financial assets (all liquid assets excluding home, business, and vehicle equity), here I defined assets as the value of owner-occupied housing and financial assets following Yadama and Sherraden (1996) and Zhan and Sherraden (2003). I 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 all the economic resources available to a household for achieving home ownership. This definition of assets is consequently less restrictive than that of Shapiro et al. (2009). For poverty threshold, referring to Shapiro (2004) and Shapiro et al. (2009), I used the down payment (10% of home value) of the median housing price. Korea's median housing price is monthly updated by the Korean Appraisal Board<sup>4</sup>. To account for a huge discrepancy in housing price between Metropolitan and non-Metropolitan areas (around \$163,000 in December 2015) in Korea, I applied different thresholds for Metropolitan and non-Metropolitan residents. Thus, within the development framework, I defined the asset poor as a household whose value of owner-occupied housing, residential fixed deposit, and financial assets is less than the down payment (10%) of the median housing price. I labelled this indicator as "Development".

<sup>&</sup>lt;sup>4</sup> Data on median housing price in Korea is only available from 2012 to 2015. Thus, I calculated the median housing price from 2005 to 2011 by applying the annual change rate in housing price provided by the Korean Appraisal Board.

In sum, as below, I used three asset poverty measurements within different theoretical frameworks. Table 2 and 3 present the national MLS according to a number of household members and the down payment (10%) of the median housing price in metropolitan and non-metropolitan areas between 2005 and 2014.

- Consumption 1 (consumption model with net worth): A household whose net worth is less than 150% of the national MLS multiplied by three months.
- Consumption 2 (consumption model with financial assets): A household whose financial assets amount to less than 150% of the national MLS multiplied by three months.
- Development (social development model): A household whose owner-occupied home equity, fixed deposits, and financial assets amount to less than the down payment (10%) of the median housing price.

Table 2.

	National Minimum	Living	Standard	(MLS),	2005	- 2014
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Vaar		Number of household members								
1 eai	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 3.

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

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

*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).

## Explanatory variables.

In the present study, I analyzed who most suffered asset poverty at different points in time between 2005 and 2014. I chose 13 socioeconomic demographics of households as time-varying explanatory variables based on a review of literature of factors influencing asset poverty (Table 4) (Kang & Yoo, 2009; Kim & Kim, 2013; Leonard & Di, 2013; Rank & Hirschl, 2010):

- The lagged dependent variable (asset poverty state in the previous year).
- A set of household-level control variables: housing tenure status (home owner and renter), residential area (metropolitan and non-metropolitan) as binary variables; ratio of productive assets, amount of disposable income, number of household members, and number of workers as continuous variable; head's age (under 40, 40-60, and over 60), gender, marital status (married, divorced/widowed/separated, and single), education level (less than high school, high school graduation, and college or higher),

and employment type (permanent worker, unemployed, temporary worker, and selfemployed) as binary or categorical variables.

• Aggregate variable: To control the effect of time-varying macroeconomic conditions, a year dummy variable was included (pre- and post-Global financial crisis of 2008).

# Table 4.

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 ( $0 = \text{Less}$ than high school, $1 = \text{High}$ school graduation, $2 = \text{College}$ or higher)
Employment type	Head employment type ( $0 =$ Permanent worker, $1 =$ Unemployed, $2 =$ Temporary worker, $3 =$ Self-employed)

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Housing tenure status, residential area, ratio of productive 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, I divided disposable income by the number of household members (per capita) and transformed it into a natural logarithm following Leonard and Di (2013), in order to reduce the variability of the data and make it conform more closely to the normal distribution. As for employment status, permanent workers were defined as employees whose contracts last for 12 months or more and are entitled to receive fringe benefits from their employers. Temporary workers indicated 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 (Statistics Korea, 2015a).

## Analytical plan.

#### Dynamic panel model of discrete choice.

To examine the persistence of asset poverty, I applied the dynamic panel model of discrete choice (binary outcome variable) to the longitudinal component of the KOWEPS data for a period, 2005-2014. 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 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). The 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).

In my analysis, the sample size for each poverty line is: 1,869 households in the sample with the net worth definition of assets (Consumption 1), 5,273 households in the sample with the financial assets definition (Consumption 2), and 2,688 households in the sample with the development definition of assets (Development). Households in each sample experienced asset poverty at least once between 2005 and 2014. To implement the dynamic panel model, I rearranged my 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 personyear 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 poverty line: 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).

For i = 1, ..., N and t = 1, ..., T, a dynamic panel model of discrete choice is defined as:

$$P_{it} = \Pr[y_{it} = 1 | y_{i,t-1} = 1, X_{it}, \mathcal{V}_i, \mathcal{E}_{it}] \quad (1)$$
$$P_{it} = \Pr[y_{it} = 1 | y_{i,t-1} = 0, X_{it}, \mathcal{V}_i, \mathcal{E}_{it}] \quad (2)$$

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), and  $X_{it}$ represents the time-varying explanatory variable.  $\mathcal{V}_i$  is unobserved individual heterogeneity (individual-specific effects) and  $\mathcal{E}_{it}$  is the random error term. In this model,  $y_{it}$  is caused by two sources: (1) the effect of  $y_{i,t-1}$ , (2) the effect of  $\mathcal{V}_i$ . These two causes may lead to different interpretations of the correlation over time. In the present study, I implemented the dynamic panel model of discrete choice by random effect (RE) logit model. The RE model assumes that the unobserved heterogeneity ( $\mathcal{V}_i$ ) is exogenous (uncorrelated with all observed variables) to control for its effects (Allison, 2009). The assumption in the RE model on the random distribution of  $\mathcal{V}_i$  is usually satisfied by national panel data with a random sampling model such as the KOWEPS and KLIPS (Min & Choi, 2013).

In the model described above, households' initial condition  $y_{i0}$  (i.e., asset poverty state at the first wave) was ignored. The initial value problem is a crucial issue when using nonlinear dynamic panel models with unobserved effects (Heckman, 1981b; Wooldridge, 2005). This problem occurs when the starting point of a survey is not the beginning of a process (Akay, 2012; Contoyannis, Jones, & Rice, 2004). For example, in the present study, some households entered asset poverty before they started to be observed in 2005 (left-censored). In much applied work in the social sciences, this initial condition problem is often assumed to be truly exogenous variables (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, I 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,

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

Where  $v_i$  (unobserved heterogeneity) =  $\overline{x_i}\lambda + \rho y_{i0} + k_i$  and  $\overline{x_i}$  is time-averaged explanatory variables as  $\overline{x_i} = \frac{1}{T} \sum_{t=1}^{T} x_{it}$ . The time-averaged explanatory variables  $\overline{x_i}$  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 time-varying explanatory variable, and  $\mathcal{E}_{it}$  is the random error term. 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). I adjusted standard errors for clustering by household unit and performed all analyses using Stata 14.

## Results

### Trends in asset poverty condition.

Table 5 indicates the proportion of households experiencing asset poverty between 2005 and 2014. Since low-income households are overrepresented in the KOWEPS data, I used the standard weight provided by the KOWEPS when estimating asset poverty rate to enhance the sample generalizability<sup>5</sup>.

The poverty rate was highest in the sample with the financial assets definition (Consumption 2) followed by the sample with the development definition of assets

<sup>&</sup>lt;sup>5</sup> Because the purpose of the standard weight is to enhance the sample generalizability, in this study, it is unnecessary to use when restricting the sample to the asset poor in the dynamic panel model.

(Development) and the net worth definition of assets (Consumption 1) across time. The asset poverty rate declined after 2006 for all the definitions of assets. For example, around 13% of households were in net worth poverty in 2005 and 2006, but this declined to around 7% after 2007. However, this finding needs to be interpreted carefully. Of 7,072 households in the first wave of 2005, 944 dropped out of the sample (sample attrition rate was 13.35% between 2005 and 2007) and 920 had missing values in net worth due to non-response in 2007. Of 1,864 households (944 who dropped out of sample and 920 with missing values), 30-55% were in asset poverty in 2005 for each analysis sample. This suggests that the sample attrition had a great impact on the estimated asset poverty rate. If I replaced the households' missing net worth values of 2007 with their net worth values of 2005, the proportion of households experiencing net worth poverty in 2007 would rise to around 11%, which is similar to that of 2005.

Table 5.

Year	Consumption1 <sup>a</sup> (net worth)	Consumption2 <sup>b</sup> (financial)	Development <sup>c</sup>
2005	.12	.40	.21
2006	.13	.38	.21
2007	.07	.35	.15
2008	.08	.35	.15
2009	.07	.33	.14
2010	.06	.30	.13
2011	.06	.32	.14
2012	.07	.30	.13
2013	.06	.28	.12
2014	.07	.29	.13
On average	.08	.33	.15

Proportion of Population Experiencing Asset Poverty by Definition of Assets, 2005 - 2014

*Note.* <sup>a</sup>Net worth poverty using 150% of the MLS as a poverty threshold. <sup>b</sup>Financial asset poverty using 150% of the MLS as a threshold. <sup>c</sup>Asset poverty using the down payment (10%) of median housing price as a threshold.

Figures 1 describes the probability of transition in asset poverty state from year to year. I divided the asset poverty transition into three parts: (a) entering poverty (non-poverty to poverty), (b) exiting poverty (poverty to non-poverty), and (c) staying in poverty (poverty to poverty). The probability of all three events was highest between 2005 and 2014 in the sample defined by financial assets (Consumption 2) because the asset poverty rate was highest for this sample. For the other two sample groups, 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. Although there was a little fluctuation in the probability of poverty transition over time in all analysis samples, the probability of staying in asset poverty tended to decrease. In the samples with the net worth (Consumption 1) and development definition of assets (Development), the probability of entering poverty tended to decrease in the early panels (2005 - 2010), but increase in the latter panels (2011 - 2014). In the sample with the financial assets definition (Consumption 2), the probability of entering poverty remained stable at around 11% over time. Although there was a temporary decrease between 2011 and 2012, the rate soon recovered to the same level. The probability of exiting poverty tended to decline across time in all analysis samples.



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

## Distribution of asset poverty spells.

Table 6 describes the distribution of asset poverty spells by households between 2005 and 2014. A poverty spell is calculated as the duration of time between the beginning and end of poverty. However, data on the duration of a poverty spell are often censored, so we do not observe the entire duration (Iceland, 1997). "Left-censored" are those spells for which we observe the end but not the beginning. Left-censored spells mostly occur when the individuals entered poverty before the observation period. On the other hand, "right-censored" are those spells are those spells for which we observe the beginning but do not observe the end. Right-censored spells are caused by the end of observation, sample attrition, or non-response.

The number of poverty spells is the aggregated number of poverty spells for all households in the sample. The numbers of spells are larger than the sample size, implying that some households entered and exited asset poverty more than once over the ten-year period (2005 – 2014). If a household entered, exited, and then reentered asset poverty during the period, it would be counted as having two asset poverty spells. For example, the Consumption 1 sample contained 2,646 asset poverty spells spread among 1,869 households. However, the full duration of around 60-80% of total asset poverty spells was unknown due to left- or right-censored observations in all analysis samples.

After excluding the left- and right-censored spells, there were 793 completed asset poverty spells in the sample with the net worth definition of assets (Consumption 1), 3,651 spells in the sample with the financial assets definition (Consumption 2), and 690 spells in the sample with the development definition (Development). Between the three samples, the share of short asset poverty spells (ending within two years) was highest in the Consumption 1 sample. On the other hand, the share of longer spells (lasting five years or more) was highest in the Development sample.

Among the completed spells, around 80 - 90% lasted less than two years. However, this finding does not imply that most asset poor households in Korea experienced asset poverty for a short time of period. Considering that the completed spells were only 20 - 40% of the total spells observed between 2005 and 2014, findings from this analysis cannot give us a complete picture of the condition of asset poverty in Korea. The large number of censored cases in this analysis might have introduced large biases (Allison, 1982).

#### Table 6.

	Consumption1 <sup>a</sup> (net worth)		Consumptio	on2 <sup>b</sup> (financial)	Development <sup>c</sup>	
Poverty spell			N (%)	)		
One year	586	(73.90)	2,246	(61.52)	443	(64.20)
Two years	120	(15.13)	749	(20.51)	129	(18.70)
Three years	51	(6.43)	337	(9.23)	63	(9.13)
Four years	15	(1.89)	167	(4.57)	24	(3.48)
Five years or more	21	(2.65)	152	(4.16)	31	(4.49)
Completed spell	793	(100.00)	3,651	(100.00)	690	(100.00)
Don't know						
Left-censored	1,390		3,647		2,4	67
Right-censored	463		1,764		521	
Total poverty spell <sup>d</sup>	2,64	46	9,062		3,678	

*Note.* <sup>a</sup>Net worth poverty using 150% of the MLS as a poverty threshold. <sup>b</sup>Financial asset poverty using 150% of the MLS as a threshold. <sup>c</sup>Asset poverty using the down payment (10%) of median housing price as a threshold. <sup>d</sup> Total poverty spell includes completed, left-, and right-censored spells.

## Summary characteristics.

Table 7 reports summary statistics on the samples between 2005 and 2014 according to the different asset definitions. Sample size varied according to the definitions of asset: 1,869 households in the sample with the net worth definition (Consumption 1), 5,273 households in the sample with the financial assets definition (Consumption 2), and 2,688 households in the sample with the development definition (Development). Larger sample size when measured by financial assets reflects that the proportion of the asset poor was highest when applying financial assets, followed by the development definition of assets and net worth over time. Depending upon the definition of assets, between 41% and 67% of each analysis sample was composed of households that experienced asset poverty in 2005, the starting point of the survey. While 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 sample based on different asset poverty measures, ranging from 4% (Consumption 1), 10% (Development) to 12% (Consumption 2). The logarithm of yearly disposable income was highest (8.96) in the sample with financial assets followed by the sample with the net worth and development definition of asset (8.88). The logarithm of 8.96 indicates that yearly disposable income per capita was approximately \$7,785 (\$648.75 a month) and the logarithm of 8.88 was around \$7,186 a year (\$598.8 a month). In all analysis samples, 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. In addition, all samples consisted of more households living in non-metropolitan areas than in metropolitan areas. The average household size was more than two for every asset definition (2.18 to 2.50). While there was less than one worker per

household in the samples with the net worth (0.92) and development definitions (0.89), in the sample with the financial assets definition, more than one person (1.08) worked per household.

# Table 7.

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 <sup>a</sup>	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/separat	ed 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*. <sup>a</sup>All variables are measured as mean value within households between 2005 and 2014.

## Estimates of dynamic panel model.

The persistence of asset poverty was estimated using the dynamic panel model of discrete choice, namely the RE model and Wooldridge probit model. The main difference between the RE and Wooldridge model is that the Wooldridge probit model controls for the initial poverty condition and time-averaged explanatory variables.

Table 8 reports the average marginal effects (AMEs) of lagged poverty state and household level variables on the probability to incur asset poverty estimated by the RE model between 2005 and 2014. The AME 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 analysis samples. The largest effect of lagged poverty state was seen in the sample with the development definition of assets (Development): the lagged poverty state led to a 21% increase in the probability to incur asset poverty. The smallest effect of lagged poverty state was observed in the sample with the net worth definition of assets (Consumption 1) and indicated that households' lagged asset poverty state increased the probability to incur asset poverty by 14%.

Home owners had a statistically significant 31-38% lower chance to experience asset poverty than renters in the sample with asset definitions that include home equity (Consumption 1 and Development). Home ownership was also a statistically significant predictor of asset poverty experience in the sample with the financial assets definition (Consumption 2) that does not include home equity although the magnitude of effect (11%) was lower than that in other samples. Households that invested one percentage point more of their asset portfolio into productive assets (non-house real estate, stocks, and bonds) were less likely to experience asset more productive assets was statistically significantly associated with a 0.1 - 1% decline in the probability to incur asset poverty. In contrast, in the sample with the development definition of assets, the ratio of productive assets statistically significantly increased the probability to incur asset poverty despite its small magnitude of effect (0.1%).

Household disposable income statistically significantly decreased the probability to incur asset poverty in all analysis samples. The estimated effect was largest when considering the sample with the financial assets definition (Consumption 2) – a unit increase in the natural logarithm of disposable income was statistically significantly associated with a 23% reduction in the probability to incur asset poverty. The magnitude of effect of income was 14% in the samples with the net worth (Consumption 1) and development definitions of assets (Development). In relation to the year dummy variable, despite the Global financial crisis of 2008, households were statistically significantly less likely to experience asset poverty after 2008.

For the effects of a household's socio-economic and demographic characteristics, the number of workers, residential area, head's gender, age, marital status, educational level, and employment status were statistically significant predictors of household asset poverty experience between 2005 and 2014. The probability to incur asset poverty decreased by 2-5% for each additional worker in a household in the samples with the financial assets (Consumption 2) and development definitions of assets (Development). Households living in non-metropolitan areas were more likely to experience asset poverty in the sample with net worth definition of assets (Consupmtion1) whereas in the sample with the development definition of assets (Development), the effect of non-metropolitan residence was negative. The age structure appeared in the sample that defined assets within the consumption model, since its effect was statistically significant: households with heads under 40 were 6-9% less likely to experience asset poverty than those

with heads aged 40 to 60. A head's socioeconomic characteristics such as gender, marital status, education, and employment type were statistically significant predictors of asset poverty experience in the samples with the financial assets (Consumption 2) and development definitions of assets (Development). Male headed households were 4% less likely to experience asset poverty than female headed households in the sample with the development definition of assets. Households whose heads were divorced/widowed/separated were 5-6% more likely to experience asset poverty than married ones. A higher level of education was associated with a decline in the probability of asset poverty experience, especially in the sample with the environment definition of assets. Precarious employment status as temporary worker or self-employed had a 3 to 7% higher chance of experiencing asset poverty. Interestingly, the effect of unemployment was not statistically significant.

# Table 8.

Variable	Consumption1(n (n=9,532	et worth) 2)	Consumption2 (financial) (n=33,204)		Developmer (n=13,773)		
Lag poverty	.14***	(.01)	.16***	(.01)	.21 ***	(.01)	
Home ownership	31***	(.02)	11 ***	(.01)	38***	(.01)	
Productive assets	01 ***	(.00)	001 ***	(.00)	.001 ***	(.00)	
Ln(Income)	14***	(.01)	23 ***	(.01)	14***	(.01)	
Non-metropolitan	.07***	(.01)	.00	(.01)	06***	(.01)	
Household size	.004	(.01)	.01	(.00)	04 ***	(.01)	
Number of workers	001	(.01)	05 ***	(.01)	02*	(.01)	
Post-crisis	09***	(.01)	01*	(.01)	06***	(.01)	
Age of under 40	09***	(.03)	06***	(.02)	03	(.02)	
Age over 60	03	(.02)	01	(.01)	02	(.01)	
Male	.03	(.02)	01	(.01)	04*	(.01)	
Divorced/widowed/separated	1.03	(.02)	.05 ***	(.01)	.06**	(.02)	
Single	.04	(.03)	.03	(.02)	.05	(.02)	
High school	.03	(.02)	01	(.01)	04 **	(.01)	
College or higher	.00	(.02)	04 **	(.01)	07 ***	(.02)	
Unemployed	.02	(.02)	.01	(.01)	.02	(.02)	
Temporary worker	.03	(.02)	.07 ***	(.01)	.03*	(.01)	
Self-employed	02	(.02)	.03 **	(.01)	.03*	(.02)	

Average Marginal Effects (AMEs) on Probability of Asset Poverty in RE Model

*Note*. Standard errors are reported in parentheses. See appendix B1 for the coefficient estimated from each model.

\* *p*<.05. \*\* *p*<.01. \*\*\* *p*<.001.

Table 9 summarizes the AMEs estimated by the Wooldridge probit model. Even after controlling the initial observations and any exogenous explanatory variables in the Wooldridge model, the effects of lagged poverty state were still statistically significant. It was associated with a 14-20% increase in the probability to incur asset poverty for all analysis samples. A household's initial poverty condition (in 2005) was statistically significant in the samples with the financial assets (Consumption 2) and development definitions of assets (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 at *t*.

Similar to findings in the RE model, in the Woodbridge probit model, 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(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(income)) were regarded as a measure of a household's long-term or permanent asset or income status (Contoyannis et al., 2004). In the samples with assets definitions including home equity (Consumption 1 and Development), home ownership statistically significantly led to a 32-37% reduction in the probability to incur asset poverty while the effect of mean home ownership was not significant. On the other hand, in the sample with the financial assets definition (Consumption 2), 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. In the sample with the net worth definition of

assets (Consumption 1), the ratio of productive assets statistically significantly decreased the probability to incur asset poverty, while the mean ratio of productive assets had a positive effect. On the other hand, the directions of effects were reversed in the sample with the development definition of assets (there was 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% for all analysis samples. The time-averaged income variable (long-term or permanent income) was statistically significant only for the sample with the financial assets definition (Consumption 2). Conditioning on the time-averaged household socioeconomic characteristics rendered the most current household characteristics nonsignificant.

## Table 9.

AMEs on Probability of Asset Poverty in Wooldridge Probit Model

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	l01	(.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 estimated from each model.

\* *p*<.05. \*\* *p*<.01. \*\*\* *p*<.001.

## 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, I measured asset poverty using the consumption and development definitions of assets.

Asset poverty was most prevalent when defining assets as financial assets. 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). The financial asset poverty rate was approximately three or four times higher than the net worth poverty rate between 2005 and 2014. Similarly, the probabilities of staying in or entering poverty from year to year were higher in the sample with the financial assets definition than in the other samples between 2005 and 2014. This may be because Koreans tend to convert their financial assets into real estate or housing (Kim & Kim, 2013; Lee & Yoo, 2015). Korea's national statistics (Statistics Korea, 2015b) revealed that while 80.4% of household wealth consisted of real estate (e.g., owner-occupied housing, real estate, and residence fixed deposit), the share of financial assets (e.g., savings, stocks, and bonds) was only 19.6%. In addition, the share of household wealth held as real estate has risen as household income level declined (Statistics Korea, 2015b). Considering that the financial asset poverty rate represents an important indicator of financial preparedness for times of economic hardship, households in financial asset poverty are more likely to experience hardship when they lose their stream of income due to unemployment or retirement (Oliver & Shapiro, 1990; Rank & Hirschl, 2010). In light of Korea's insufficient social safety net, this should concern policymakers. For example, in Korea, the net pension

replacement rate, which measures how effectively a pension system provides a retirement income to replace earnings, was only 45.0% in 2014, far below the OECD average of 63.2% (OECD, 2017). In addition, only 22.4% of temporary workers joined unemployment insurance in 2014 (Statistics Korea, 2014).

It is interesting to note that in the sample with the development definition of assets (Development), the probability of staying in poverty was higher than in the net worth sample (Consumption 1), even though the probability of entering or exiting poverty was the same for the two samples from 2005 to 2014. This finding suggests that the asset poor identified by the development asset poverty line are likely to stay in poverty rather than repeatedly exiting or entering asset poverty over time. The distribution of poverty spells also shows that the share of poverty spells that last five years or more was higher in the sample measured by the development asset poverty line than in the samples measured by the consumption asset poverty line.

The RE model and Wooldridge models show that, with an assumption on the random distribution of unobserved heterogeneity, there is evidence of true state dependence. In other words, 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 in the sample with the development definition of assets (Development) followed by those in the samples with the financial assets (Consumption 2) and net worth definitions of assets (Consumption 1). After conditioning on the initial poverty state and time-averaged explanatory variables in the Wooldridge probit model, the effect of lagged poverty state was still statistically significant and there was no substantial reduction in the magnitudes of effects. Furthermore, a household's initial poverty state (in 2005) was a statistically significant predictor of asset poverty experience in the sample with the financial assets (Consumption 2) and development definitions of assets

(Development). It is consistent with Leonard and Di (2013)'s revelation that households in asset poverty were more likely to remain close to their initial condition than move far away from it. 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 is 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 even deepens over time (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.

The present study revealed that home ownership, greater ratio of productive assets, and higher disposable income statistically significantly decreased the chance to incur asset poverty for most analysis samples. Home ownership had a great negative effect on the probability of asset poverty experience not only in the samples that include home equity in the asset definition but also in the sample that only considers financial assets. 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. As expected by previous research (Leonard & Di, 2013; Zimmerman & Carter, 2003), the asset portfolio allocation in

productive assets might reduce the probability to incur asset poverty. Considering that productive assets are owned by richer 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 the ratio of productive assets increased the probability to incur asset poverty in the sample with the development definition of assets, albeit with a small magnitude of effects (.001 or .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).

When controlling for time-averaged variables in the Wooldridge model, findings reveal that transitory income shocks had a greater impact on the probability of asset poverty experience than permanent income (time-averaged income). Although permanent income was statistically significant in the sample with the financial assets definition, its magnitude of effect was smaller than that of current income. This finding corresponds to the permanent income hypothesis by Friedman (1957). According to the permanent income hypothesis, an increase in transitory income may lead to a rise in durable goods (e.g., house or vehicle) and financial assets of a household (Darby, 1972; Friedman, 1957). In addition, some more recent empirical research has found that transitory income plays an important role in influencing the decision of home purchase (Boehm, 1993; Henderson & Ioannides, 1987). Thus, considering that a rise in transitory income leads to an increase in household assets, policy that encourages the poor to increase their current earnings should be accompanied by asset-based policy and interventions that encourage the poor to accumulate assets.

Findings from the RE models provide empirical evidence that the probabilities to incur asset poverty were disproportionately distributed across socio-demographic groups. Consistent

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with previous research (Haveman & Wolff, 2005; Kang & Yoo, 2009; Kim & Kim, 2013; Leonard & Di, 2013), heads being divorced/widowed/separated, less educated, and having precarious employment status such as temporary workers or the self-employed was associated with a higher chance of asset poverty experience at different points in time between 2005 and 2014. Contrary to general expectation, being unemployed was not a statistically significant predictor of asset poverty experience while temporary workers and the self-employed were more likely to experience asset poverty over time. This finding needs to be cautiously interpreted because the asset poor should work since they do not have any assets to depend on (reverse causation; Nam & Kwon, 2008). Future research is needed to shed light on how family structure and human capital shape asset poverty risk over time.

According to the life cycle hypothesis, assets are unequally distributed across age groups in a hump-shaped pattern. The theory supposes that certain age groups (under 40 or over 60) may experience more asset poverty than the middle aged group (40 to 60; Rank & Hirschl, 2010). Contrary to this hypothesis, findings in this study show that people under 40 were less likely to experience asset poverty than the reference group (aged 40-60) in the samples that defined assets within the consumption model. This is consistent with Suk (2012)'s suggestion that the pattern of asset poverty across age groups in Korea does not fit the life cycle model. Suk (2012) showed that households with heads aged 40-60, especially those with female heads, were the highest share of the asset poor in Korea. The high probability of asset poverty experience for the middleage group (40-60) compared to the other age groups may have a few possible explanations. First, it may be related to a rise in the working poverty rate in Korea. According to Noh (2013), the number of working-age individuals (age 18-65) who fell into relative income poverty (50% of median disposable income) was estimated to be 2,920,000, or 7.3% of the Korean population. In
particular, among the working-age group, the income poverty rate of the middle-age group was twice as high as that of other age groups (Noh, 2013). This is perhaps due to a rising instability of employment status for middle-aged workers (Nam & Kwon, 2008; Yoo, Kang, & Jung, 2014). According to the Statistics Korea (2015a), among total wage workers, 32.5% were temporary workers, and around 42% of temporary workers were aged 40-60. In addition, among non-wage workers such as the self-employed and unpaid family workers, 56.2% were aged 40-60. The wages of temporary workers have been around 54% of that of permanent workers in Korea, and only around 40% of temporary workers are offered fringe benefits such as severance pay, bonuses, and paid holidays (enjoyed by more than 80% of permanent workers). Next, high financial burdens from care responsibility including child care-related expenses have also worsened the economic hardship of the middle-age group. Due to low family benefits public spending in Korea (1.12% of GDP compared to the OECD average 2.1% in 2013; OECD, 2017), most of the responsibility for the care of dependent family members, such as children, the elderly, and the disabled, falls primarily on independent (and working age) household members in Korea (Lee & Ban, 2009). Thirdly, high intergenerational dependency in Korea may increase the probability of asset poverty experience among the middle-aged. Young adults, whose job status is often insecure, will fall back on their parents (still breadwinners in their households) in the case of economic hardship, and this extra burden on the middle-aged parents increases their risk of becoming poor even while in their prime years at the core of the labor market (Lee, Lee, Choi, & Lee, 2011; Lohmann & Marx, 2008).

Interestingly, living in non-metropolitan areas had opposite effects for the samples with the net worth (Consumption 1) and development definitions of assets (Development). This may be explained by difference in the asset poverty threshold between two samples, 150% of MLS for the net worth sample and 10% of median housing price for the development definition sample. Because of a huge discrepancy in the median housing price between metropolitan and non-metropolitan areas (a difference of around \$163,000 in December 2015), households in metropolitan areas might be unable to afford to buy homes even though their median household wealth was twice as high as the wealth of those in the non-metropolitan residents (Statistics Korea, 2015b). According to the Statistics Korea (2015b), the home ownership rate was 66.8% in nonmetropolitan areas and 50.3% in metropolitan areas.

#### **Research Limitations and Implications**

The present study used the KOWEPS data between 2005 (1<sup>st</sup> wave) and 2014 (10<sup>th</sup> wave). From the 1<sup>st</sup> to the 10<sup>th</sup> wave, there was an approximate sample attrition rate of 30% in the data, and attrition was highest among those within low-income status. Although the dynamic panel model of discrete choice enabled this study to address the issues from sample attrition, findings in this study should be cautiously interpreted as there may remain a risk that the results would be contaminated by attrition bias. In addition, due to data limitations (a large number of left- and right-censored data), I cannot include the duration of asset poverty in the model. 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 Conditions could be a good data resource to analyze the dynamics of asset poverty in Korea.

Next, future research should consider the depth of asset poverty when analyzing the dynamics of asset poverty. In this study, I identified the asset poor as below or above the asset poverty line using a dichotomous variable. Although this approach is simple and tells us how many people are considered poor, it tells us nothing about the average depth of poverty among the poor (Brady, 2003; Sen, 1976). To address this concern, future research could measure the depth of poverty as the average distance of poor households from the poverty threshold (Kakwani, 1993). By considering the depth of poverty, we can capture the variability of poverty conditions below the threshold, and thus analyze differences between, for example, the asset poor who fall just below the poverty threshold and the desperately poor who have no assets at all (Brady, 2003).

Lastly, future research is necessary to examine the extent of asset poverty reproduction 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). Similarly, development theory pays attention to the intergenerational transmission of assets, particularly through the form of child education. Empirical evidence supports this idea by showing that in the US, assets were passed down from parents to children, or grandparents to grandchildren (Pfeffer & Killeward, 2015; Shapiro, 2004). Investigating intergenerational asset transfer 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). In the KOWEPS, members of the original households are followed if they form or join new households, in which case they are added to a new sample group. To avoid muddling the analysis, I excluded this new sample group and considered only the original sample in this analysis. However, in future research, with data accumulation, analyzing this new sample group will allow examination of how asset poverty status has passed on from one generation to the next in Korea.

# **Policy Implications**

The results from the present study are highly relevant for policies aimed at improving household's permanent welfare status. First, 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, 2015b). Therefore, a progressive policy strategy is needed to encourage household home ownership in Korea. The *Central Provident Fund (CPF)* of Singapore could be a good example. In Singapore, most social provisions for old age, housing, transportation, health care, investment, and education are financed out of the CPF's individual asset accounts (Sherraden, 2003; Sherraden, Nair, Vasoo, Liang, & Sherraden, 1995). In particular, the CPF has led to a rise of home ownership, even for low income families (90% of Singaporeans own their homes), which has in turn enhanced social stability in Singapore (Sherraden, 2003).

Second, the present study revealed that households that invest more in productive assets were less likely to experience asset poverty. However, according to the Statistics Korea (2015b), only 8.0% of households at the bottom quintile of asset distribution own productive assets (e.g., fixed deposit, stock, bonds, and non-house real estate) in their asset portfolio while 66.4% at the top quintile own productive assets. As previously mentioned, the risks and returns need to be properly balanced in household asset portfolio (Leonard & Di, 2013). Accordingly, financial education is needed to encourage the asset poor to make prudent investment decisions and accumulate assets (Beverly & Sherraden, 1999). In Korea, the Committee for Credit Counseling

and Recovery Service (CCRS) runs the targeted financial education program, and the National Pension Service (NPS) provides education and counseling services for financial preparedness after retirement. However, one survey shows that only 18% of adult individuals in Korea have experienced financial education (Yoon, 2012). Thus, it is necessary to enhance the accessibility of financial education, especially for disadvantaged populations. One strategy for the wide distribution of financial education programs among disadvantaged groups is to encourage social workers to build their own financial knowledge by completing the training course provided by the CCRS.

Next, the present study suggests that current income plays an important role in reducing the chance of asset poverty experience. Many low income individuals may never have earnings that substantially exceed their consumption needs and they are unlikely to make long-term decisions regarding saving and consumption (Beverly & Sherraden, 1999). In particular, for middle-aged workers, precarious employment status and high care responsibilities for their dependent family members can be a barrier to saving for the future. Therefore, policy is needed to help low income households increase their earnings and hence save and build assets. Based on the notion that the labor market plays the most significant role in the distribution of income in society, asset-building policies that lead to increased or more secure participation in the labor market open new possibilities for poverty reduction (Shapiro, 2001). In practice, for example, matched savings programs should consider enrolling their participants in Active Labor Market Policies (ALMPs) such as job creation, job consulting and training, and employment incentives that enable them to get a decent job, increase earnings, and accumulate assets (Choi, 2014; Shapiro, 2001; Suk, 2012).

Lastly, policymakers and researchers should consider alternative measures of poverty based on both the income and assets at a household's disposal. The joint income-asset criterion 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). The asset poverty line suggested in this study can provide the foundation for establishing a joint incomeasset poverty measure. Furthermore, in contrast to the current asset-building programs, which primarily use income measures to determine eligibility, I suggest that asset-based programs should determine eligibility using asset-based poverty measures. In particular, considering the high financial burden of housing on middle-income households (Jin, 2013), home ownership programs can effectively work by adopting the development asset poverty line suggested in this study in its eligibility rules.

#### Chapter 3

#### Asset Poverty and Material Hardship in South Korea

#### Abstract

This study tests how strongly material hardship experience is associated with asset poverty in comparison to its association with income poverty in Korea. Material hardship identifies the poor as those whose actual consumption fails to meet the basic needs (Beverly, 2001). The main purpose of this study is to contribute to our understanding of the living conditions of the poor and the causes of material hardship including food, housing, utilities, and health hardship. Using the binary logistic regression analysis, this study found that: (a) the associations between poverty and material hardship were statistically significant when applying either assets or income; (b) despite better socioeconomic status, households who were poor only in assets (and not income) were more likely than households who were income poor but not asset poor to experience all types of material hardship except for food; and (c) larger households, households that rented rather than owned their homes, and households whose heads were younger, single, self-employed, or temporarily employed suffered more hardship. These findings suggest that the asset poor are more vulnerable to material hardship than is estimated by the income poverty measure, and that a household's actual living condition is affected by all types of economic resources including cash income, assets, employment benefits, and transfers. I describe how future research needs to expand hardship measures to encompass various living conditions in relation to the current Korean social context. This study implies that policy responses to poverty could be improved to the extent they consider the type and amount of a household's available economic resources.

Until recently, both academics and policymakers have widely used absolute measures of income poverty. Absolute income poverty measures enable poverty research to identify the population as below or above an official poverty threshold established by an informed, yet controversial decision about what is necessary to make ends meet (Blackwood & Lynch, 1994; Brady, 2003). Research using absolute income poverty measures has significantly contributed to theory and policy implications, yet in recent years, many scholars and policymakers have argued that absolute income measures provide an inadequate assessment of poverty (Brady, 2003). One of the biggest concerns is that the absolute income poverty measure fails to capture the real dimensions of hardship and deprivation of different groups of people and households (Beverly, 2001b; Halleröd & Larsson, 2008). Because of the problems with absolute income poverty measures and the consequences that poverty measure selection has for social policy priorities and theoretical conclusions, scholars have devoted a great deal of research to devising innovative poverty measures (Atkinson, 1998; Brady, 2003). As discussed in the previous two chapters of this dissertation, some scholars have argued for the asset poverty measure as an alternative to the income poverty measure. Asset poverty measures, they say, capture the multidimensional conditions of poverty including food, health, education, and security (Nam, Huang, & Sherraden, 2008). Furthermore, scholars have introduced the concept of material hardship as a direct measure of the actual living conditions of the poor (Beverly, 2001b). In the present study, I examine the association between asset poverty and material hardship in Korea. To my knowledge, this is one of the first studies to estimate the poverty condition in Korea by asset poverty and material hardship, and as such it contributes to our understanding of the living conditions of the poor and the causes of material hardship.

#### **Poverty Measures in Existing Research**

Early discussions of poverty measures focused on the minimum income level necessary to sustain physical existence. In his pioneering work, Rowntree (1902) stated that families living in poverty were those "whose total earnings are insufficient to obtain the minimum necessaries (food, housing, and household sundries) for the maintenance of merely physical efficiency" (p.86). Rowntree (1902)'s poverty concept based on minimum needs was adopted by Beveridge to construct social security benefits in the UK after World War II, and it has since been commonly used as a reference for poverty threshold and social security benefit scales in many countries (Townsend, 1962; Veit-Wilson, 1992). In the US, Orshansky (1965) later identified the poor as those whose income cannot meet minimum needs. She measured minimum needs based on the cost of food, and defined the poor as those whose pretax family income falls below the estimated cost of a minimum diet for the family, multiplied by three (Orshansky, 1965, 1969). Her efforts were based on the assumption that no more than a third of a family income is used for food. Orshansky (1965)'s work laid the basis for the official poverty line used in the US today.

However, many researchers have questioned whether this approach sufficiently measures the living condition of the poor. In particular, some researchers have argued that there is no one, universal way (applicable at any time and in any society) to define the absolute necessities of life to maintain physical health (Atkinson, 1975; Townsend, 1962). As Orshansky (1965) explicitly stated, even for food, which might appear to provide the firmest foundation, there is no certain way to determine the quantity and variety of food that will meet nutrition goals and customary eating patterns in the society. Different groups of people and households have different consumption habits and face different demands, and money income is unlikely to capture these differences in need (Atkinson, 1975; Townsend, 1962). Researchers (e.g., Atkinson, 1975; Sen, 1979; Townsend, 1962) have therefore suggested that poverty is a relative concept which should be interpreted in relation to the particular society's living standard. For example, Townsend (1979) described poverty as relative deprivation, not an absolute state. He defined relative deprivation as the "conditions of individuals, families, and groups in the population who lack the resources to obtain the type of diet, participate in the activities and have the living conditions and amenities which are customary, or at least widely encouraged or approved, in the societies to which they belong" (Townsend, 1979, p. 31). Around the same time, Sen (1979) noted two different conceptions of poverty used to identify the poor: the direct method and the income method. The direct method defines the poor as those whose actual consumption fails to meet the accepted conventions of minimum needs, while the income method defines the poor as those who do not have the income to meet these needs (Sen, 1979). The income method has an advantage of providing a metric of numerical distance from the poverty line, but fails to consider that the pattern of consumption behavior is inconsistent, and prices facing different groups of people differ by social class, income group, and locality (Sen, 1979).

Inspired by the work of Sen (1979) and Townsend (1979), some recent poverty research has used the material hardship measure to directly estimate the multidimensional poverty condition. Material hardship identifies the poor as those whose actual consumption fails to meet the basic needs for food, housing, basic goods, clothing, and medical care (Beverly, 2001b). Empirical studies in the US, UK, and Korea have estimated the prevalence of material hardship and tested the association between a household's hardship conditions and income poverty status (Berner, Ozer, & Paynter, 2008; Beverly, 2001a; Bradshaw & Finch, 2003; Dhongde & Haveman, 2016; Iceland & Bauman, 2007; Lee, 2011; Mayer & Jencks, 1989). These studies found that income is insufficient to estimate the household's material hardship conditions, and that hardship may be caused by other economic factors besides income.

# **Background Studies**

There is no consensus definition of material hardship. Previous research in Korea, the US, and UK has used various different hardship measures and found that the income poor do not necessarily overlap with those who suffer from a lack of basic necessities. Mayer and Jencks (1989) estimated material hardship in Chicago using ten hardship indicators: food expenditure, food affordability, rent unpaid, housing crowded, eviction, utilities off, housing problem, no health insurance, unmet medical needs, and unmet dental needs. They found that a family's official income-to-needs ratio (annual family income divided by the family's official poverty threshold) explained only 24% of the variance in the amount of material hardship. A family's income-to-needs ratio explained more of the variations in the total number of hardships than any particular hardship. Among ten hardship measures used in their study, food hardship was the best explained by the income-to-needs ratio (Mayer & Jencks, 1989). For creating hardship indicators that are widely acceptable, statistically defensible, and operationally feasible, Beverly (2001b) suggests seven principles: it should (a) include food, housing, utilities, medical care, clothing, and consumer durables which are essential components of well-being, (b) reflect basic standards of material adequacy, (c) measure the severity of hardship, (d) capture objective and direct conditions, (e) indicate the cause of hardship as much as possible, (f) include composite indices of hardship as well as separate measures. Considering these principles, in another study, Beverly (2001a) estimated material hardship in the US using six indicators of food, housing, utility, and medical needs. Interestingly, Beverly (2001a) found that working households were sometimes more vulnerable to material hardship than non-working households, even though working

households had higher incomes. For example, for part-time working households, the share of households experiencing material hardship was roughly 3% higher than that of non-working households (Beverly, 2001a). Full-time and part-time working households were more likely to experience housing, utility, and health hardship than non-working households, but non-working households were more vulnerable to food insufficiency (Beverly, 2001a). In a similar vein, Bradshaw and Finch (2003) revealed that there was very little overlap between the groups of people deemed poor by the different poverty measures. To explore the association between different dimensions of poverty, Bradshaw and Finch (2003) identified the poor by applying three different measures (necessities poor, income poor, and subjectively poor) to the same sample from the Survey of Poverty and Social Exclusion in the UK in 1999. Here, they identified the "necessities poor" as households lacking four or more of 25 items deemed to be adult necessities, such as housing, food, clothing, and furniture. The subjectively poor are those who said that they felt poor, and the income poor are those whose equivalent household income was less than 60% of the median income. Bradshaw and Finch (2003) found that while 33% were poor in at least one poverty dimension, only 5.7% were poor on all three measures simultaneously. In addition, for the necessities poor, the odds of being income poor was only 2.32 while that of being subjectively poor was 13.40 (Bradshaw & Finch, 2003).

Although most research treats material hardship as a single phenomenon with multiple indicators, some studies have differentiated the causes and consequences of various hardship measures. Iceland and Bauman (2007) examined associations between the timing, depth, and duration of income poverty and various types of material hardship (e.g. consumer durables, housing condition, fear of crime, neighborhood conditions, difficulty meeting basic needs, and food insecurity). They found that the association between poverty and hardship varied by the measure of poverty and hardship used. For example, housing problems, fear of crime, and neighborhood problems were affected by factors such as assets and human capital more than by income, but food insecurity, difficulty paying bills, and possession of consumer durables were more sensitive to temporarily income changes (Iceland & Bauman, 2007). To establish a theoretical and conceptual framework of material hardship measures, Heflin, Sandberg, and Rafail (2009) developed and tested various conceptual models of the structural coherence of material hardship including a resource allocation model, a necessity model, a time horizon model, and a distinct dimensions model. Using data from the Survey of Income and Program Participation (SIPP), they found that the distinct dimensions model fit the data best, followed by the time horizon model. The distinct dimensions model considers the causes and consequences of different dimensions of hardship, such as health, food, bill paying, and housing hardship, as all distinct from one another. In contrast, the time horizon model classifies hardships into long-term (health and housing) and short-term (food and bill paying) according to their causes and consequences. Thus, in both models, the causes and consequences of a specific hardship (e.g., food) may not be generally applied to households experiencing other forms of hardship (Heflin et al., 2009).

#### Material hardship in Korea.

Empirical studies in Korea also have shown that income inadequately explains the distribution of material hardship. Using the Korean Welfare Panel Study (KOWEPS) data, Lee (2011) analyzed the hardship condition of households whose income was below the national minimum living standard (MLS) in Korea. To estimate material hardship, Lee (2011) chose 11 indicators related to food, utilities, housing, and medical needs. He found that while income did not significantly affect household experience of material hardship, other economic factors such

as employment status, health condition, housing tenure status, and assets had meaningful associations with the hardship conditions of low income households (Lee, 2011). Kim, Shim, and Lee (2015) also restricted their sample, analyzing only households whose income was less than 60% of the median household income in the KOWEPS data. By using five hardship indicators related to food, utility, housing, and medical needs, they found that among these low-income households, households in the hardship group were more likely to have higher income and education levels than those in the no-hardship group. This suggests that among low-income households, those with better socioeconomic status (the near-poor or working poor) might perceive a higher level of hardship, because households in this group were likely to be excluded from the current social security system (Kim et al., 2015). Moreover, households experiencing material hardship were more likely to be headed by the nonelderly (under 65), temporarily employed, reside in a metropolitan area, and have children (Kim et al., 2015).

#### Limitations of previous research.

In sum, previous research suggests that lack of income is insufficient to explain the material hardship experience of households, and that different economic resources beyond income such as physical assets, fringe benefits, and human capital may be necessary to meet basic needs (Beverly, 2001a; Iceland & Bauman, 2007; Lee, 2011). Further, existing research has established that discussions about the relationship between poverty and material hardship are sensitive to the indicators used. However, the research fails to reveal the extent to which lack of non-income economic resources causes material hardship. Although Lee (2011) found that ownership of housing and financial assets such as savings, stocks, and bonds were statistically significantly associated with a low likelihood of household hardship experience in Korea, this

finding is of limited applicability to the general population because he restricted his sample to households whose income was below the MLS.

Prior research on asset poverty described in the first and second chapters of this dissertation suggests that household living conditions in a given year may vary by both income fluctuation and asset ownership. For example, some households lose their income flow due to retirement or unemployment and become income poor, but do not lack for consumption necessities because they still have the assets acquired in better times (Bradshaw & Finch, 2003). Thus, asset poverty is viewed as an indicator of the long-term household economic security (Haveman & Wolff, 2005).

# **Research Questions**

I build on existing literature and contribute to the understanding of the distribution of material hardship in at least two ways. First, I examine how strongly material hardship experience is associated with asset poverty, and compare this relationship with that of income poverty. I focus on this to compensate for previous research that has mostly focused on the association between income poverty and material hardship and does not show the effects of lack of assets on living conditions. Second, I analyze how the associations of asset and income poverty with hardship differ between the four forms of material hardship measured here. Previous research has noted that various hardship measures are not identical, but has not analyzed this in sufficient detail. To address these gaps in knowledge, the present study is guided by the following three questions: (a) To what extent is asset and income poverty associated with material hardship? (b) How does the association vary according to the form of material hardship?

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# Method

# Source of data.

Data in this study came from the 10th wave of the KOWEPS, the largest set of panel data in Korea on this topic. Respondents' answers to the questionnaire in the KOWEPS are based on events in the previous year. For the 10th wave collected in 2015, stock variables (e.g., assets) were measured on December 31st, 2014 and flow variables (e.g., income and expenditure) were measured over the year of 2014. As mentioned in the second chapter, since the 7th wave, the KOWEPS data were supplemented with 1,800 households to make up for sample attrition (Choi, Oh, Son, Leem, & Jung, 2013). The addition of a new sample group was to prevent attrition bias since attrition in the KOWEPS data was mostly concentrated among lower socioeconomic households (Choi et al., 2013). According to Choi et al. (2013), the households added in the 7<sup>th</sup> wave are homogeneous with the households lost to attrition in terms of income, assets, and consumption status. In the present study, I analyzed 5,938 households excluding 976 cases that were missing information in the focal variables (such as value of assets). Of these, 1,349 households were from the newly added sample and 4,589 households were from original sample. In the KOWEPS, members of the original households are followed if they form or join new households, thereby, of the 4,589 households from the original sample, 459 cases were newly entered after the first wave because of family splits or changes in marital status.

#### Measurement.

#### Dependent variable: material hardship.

In the present study, following previous research (Beverly, 2001a; Heflin et al., 2009; Lee, 2011), 11 dichotomous indicators of material hardship were grouped into four categories: food, housing, utility, and health hardship (Table 1). Because hardship data were collected at the

household level in the KOWEPS, hardship indicators refer to household experiences. All individuals living in households whose head (or head's spouse) reported experiencing hardships were assumed to have experienced those particular hardships.

For the food hardship measure, I used five questions in the KOWEPS of household questionnaire: (a) food did not last, (b) did not eat balanced meals, (c) skipped meals/did not have enough to eat, (d) ate less than needed, and (e) hungry but did not eat. To measure housing hardship, I used two indicators in the KOWEPS: (a) eviction and (b) heating system. The first indicator is whether survey respondents said the household had to move to another house because of not paying the rent for at least two months. The second indicator is whether the household was unable to use the heating system during the winter because they could not afford to pay for it. For measuring utility hardship, I used two indicators: (a) bill-paying hardship, and (b) utility disconnection. The bill-paying hardship is an indicator of whether survey respondents said there was a time in the previous year when they did not pay the full amount of their national social insurance (pension, unemployment, and occupational health and safety insurance) contributions or utility bills, such as electricity, telephone, or water bills. Utility disconnection is an indicator of whether they said their electricity, telephone, or water had been disconnected for lack of payment. Finally, two indicators were used to measure health hardship: (a) medical need and (b) lack of national health insurance. For an indicator of medical need, respondents were asked if there was a time in the previous year when someone in the household needed to see a doctor but could not afford to go. For an indicator related to national health insurance coverage, respondents were asked if there was a time when they were unable to pay the health insurance premium and lost their eligibility for the national health insurance service. Due to a skewed distribution of a counted material hardship measure (90.77% of the analytic sample reported not

experiencing any hardship, ranging from 0 to 11), I created a binary variable using these indicators. A value of 1 was assigned to all households whose head (or head's spouse) reported experiencing more than one hardship indicator due to economic difficulties in the previous year. Otherwise a value of 0 was assigned. In sum, five dichotomous dependent variables were used to measure a household's material hardship experience: (a) total hardship, (b) food hardship, (c) housing hardship, (d) utility hardship, and (e) health hardship.

# Table 1.

Construction of Material Hardship Variables

Variables	Questions
Food hardship	1) "Has there been a time in the last year when the household ran out of food and could not afford to buy more?" (Yes = 1; No = 0)
	2) "Has there been a time in the last year when the household could not afford balanced meals?" (Yes = 1; No = 0)
	3) "Has there been a time in the last year when adults in the household skipped meals or did not have enough to eat?" (Yes = 1; No = 0)
	4) "Has there been a time in the last year when household ate less than needed?" (Yes = 1; No = 0)
	5) "Has there been a time in the last year when the household was hungry but did not eat?" (Yes = 1; No = 0)
Housing hardship	1) "In the last year, have you ever been evicted from your home because you couldn't pay your rent for more than two months?" (Yes = 1; No = 0)
	2) "In the last year, have you ever been unable to use heating system properly during the winter?" (Yes = 1; No = 0)
Utility hardship	1) "Has your electricity, telephone or water been turned off because you couldn't pay the bill any time during the last year?" (Yes = 1; No = 0)
	2) "Have you ever been unable to pay the national social insurance contributions or utility $bill(s)$ before a due date during the last year?" (Yes = 1; No = 0)
Health hardship	1) "Has there been a time in the last year when you or anyone else in your family needed to see a doctor but couldn't afford to go?" (Yes = 1; No = 0)
	2) "Have you ever been unable to pay the national health insurance premium and lost eligibility?" (Yes = 1; No = 0)

#### Independent variable: asset and income poverty.

Material hardship measures identify the poor whose actual consumption fails to meet their basic needs because of a lack of economic resources. Thus, in relation to material hardship, assets can be defined as the economic resources that can protect a household from experiencing hardship. Asset poverty was measured with the *Consumption 1* indicator used in the first study (the second chapter) of this dissertation: i.e., net worth of less than 150% of the MLS multiplied by three months. For Consumption 1, I defined assets according to Haveman and Wolff (2005) as a resource for future consumption to sustain basic needs during temporary hard times<sup>6</sup>.

I identified the income poor as those whose monthly disposable income was less than 150% of the MLS. As mentioned in the first study of this dissertation, because the MLS level is considered too low, 150% of the MLS has been widely used as the poverty threshold in both policy and research (Kim, Ra, & Ryu, 2013; Noh, Hong, Choi, Jun & Park, 2009). Monthly disposable income refers to a household's average monthly gross income (wages, salaries, interest income, transfers, and social benefits) minus direct taxes and social contributions.

By applying the asset and income poverty measures described above to this study, I classified the sample into four different groups. Following Haveman and Wolff (2005), I classified the sample into: (a) neither asset nor income poor ("non-poor"), (b) poor in both income and assets ("joint poor"), (c) only poor in assets ("asset poor only"), and (d) only poor in income ("income poor only").

<sup>&</sup>lt;sup>6</sup> In the present study, I only used the Consumption 1 to measure asset poverty for three reasons. First, in relation to material hardship and lack of household consumption, assets may function as a resource for future consumption. Next, net worth can give a comprehensive picture of household assets. Lastly, using Consumption 1 helps to clarify the analysis and avoid unwanted complications.

#### Explanatory variables.

Previous research found statistically significant associations between the distribution of material hardship and households' socioeconomic characteristics such as age, education, gender, marital status, employment type, residential area, housing tenure status, and family type (Beverly, 2001a; Kim et al., 2015; Lee, 2011; Mayer & Jencks, 1989). Referring to these empirical studies, I chose nine socioeconomic demographics as covariates described in detail below. These covariates were gathered from the KOWEPS data by using a household file.

Characteristics of households

I included the following household-level variables: housing tenure status (homeowner and renter) and residential area (metropolitan and non-metropolitan) as binary variables; the number of household members and the number of workers in a household as continuous variables.

Characteristics of household heads

I used the following individual-level variables: age as a continuous variable; gender (female and male), marital status (married, divorced/widowed/separated, and single), education level (less than high school degree, high school graduation, and some college or higher), and employment type (permanent worker, unemployed, temporary worker, and self-employed) as binary or categorical variables.

# Analytical plan.

To describe the socio-economic characteristics of the non-poor, joint asset-income poor, asset poor only, and income poor only, I used primarily descriptive statistics. Then, I conducted binary logistic regression to examine the association of a household's poverty condition with material hardship experiences using the 10<sup>th</sup> wave of KOWEPS. Because low-income

households are overrepresented in the KOWEPS data, in the logistic regression analysis I used the standardized weight provided by the KOWEPS to enhance the generalizability of the sample. **Results** 

# Sample characteristics.

Descriptive statistics presented in Table 2 show the characteristics of the sample according to household poverty status. Of the whole sample (5,938 households), 62.93% were neither asset poor nor income poor, 4.41% were joint poor, 3.13% were asset poor only, and 29.52% were income poor only. The socio-economic characteristics of the four groups were significantly different from each other. While heads of non-poor and asset poor only households were middleaged, 55 years old for the non-poor and 50 for the asset poor only, heads of joint poor and income poor only households were older, 62 years old for the joint poor and 71 for the income poor only. Non-poor households averaged 2.86 people and asset poor only households averaged 2.63 people. These numbers were close to the average household size in Korea (2.5 in 2015; Statistics Korea, 2015b). On the other hand, household size was smaller in joint poor households (1.95) and income poor only households (1.85). It was similar to the average household size of welfare recipients in Korea (1.7 in 2009; Korean Ministry of Health and Welfare [KMOHW], 2009). More than one person worked on average in non-poor households (1.48) and asset poor only households (1.37), but less than one person worked in joint poor (0.39) and income poor only households (0.61). While male heads were prevalent among the non-poor and asset poor only, the share of female heads was similar to that of male heads among the joint poor and income poor only. Most heads of non-poor households were married (74.74%) whereas joint poor households had the highest proportion of single and divorced/widowed/separated heads (around 70%). Heads of joint poor and income poor only households were less educated

compared to the more than 60% of asset poor only and non-poor household heads who had more than a high school degree. While among non-poor and asset poor only households, the unemployment rate was only 20.20 to 24.19%, joint poor and income poor only households had a greater proportion of unemployed heads (63.21 to 73.28%). Among asset poor only households, around 61% were wage workers: 40.86% of them temporary workers and 20.97% permanent workers. The share of permanent workers among the asset poor only was almost ten times higher than that of the joint poor and income poor only, but the asset poor only group also had the highest share of temporary workers among all four groups. The non-poor and income poor only groups contained more homeowners (around 70%); less than 10% of the joint poor and asset poor only were homeowners. All four groups contained more households living in nonmetropolitan areas than in metropolitan areas. In sum, the non-poor were primarily middle-aged, male, married, highly educated, permanent workers, and homeowners. The asset poor only had similar socioeconomic characteristics to the non-poor except for the high share of temporary workers and renters. On the other hand, the joint poor were generally older, single and divorced/widowed/separated, less educated, unemployed, and renters. A similar pattern was found in the income poor only except that they had a higher share of married heads and homeowners.

Table 2.

Sample Characteristics

Variable	Non-poor	Joint poor	Asset poor only	Income poor only	Test statistic
N (%)	3,737 (62.93)	262 (4.41)	186 (3.13)	1,753 (29.52)	
			M (SD)		
Age	54.67 (14.28)	61.65 (13.74)	50.09 (12.45)	70.59 (11.48)	110.02***
Number of household members	2.86 (1.27)	1.95 (1.10)	2.63 (1.37)	1.85 (0.97)	171.77***
Number of workers	1.48 (0.89)	0.39 (0.63)	1.37 (0.84)	0.61 (0.79)	73.22***
			N (%)		
Male	3,074 (82.26)	137 (52.29)	124 (66.67)	965 (55.05)	502.14***
Marital status					634.87***
Married	2,793 (74.74)	77 (29.39)	82 (44.09)	857 (48.89)	
Divorced/widowed/separated	733 (19.61)	158 (60.31)	78 (41.94)	833 (47.52)	
Single	211 (5.65)	27 (10.31)	26 (13.98)	63 (3.59)	
Education level				1	,100.00***
Less than high school	1,202 (32.16)	165 (62.98)	56 (30.11)	1,346 (76.78)	
High school graduation	1,222 (32.70)	70 (26.72)	82 (44.09)	270 (15.40)	
Some college or higher	1,313 (35.14)	27 (10.31)	48 (25.81)	137 (7.82)	
Employment type				1	,500.00***
Permanent worker	1,347 (36.04)	10 (3.82)	39 (20.97)	35 (2.00)	
Unemployed	755 (20.20)	192 (73.28)	45 (24.19)	1,108 (63.21)	
Temporary worker	702 (18.79)	48 (18.32)	76 (40.86)	217 (12.38)	
Self-employed	933 (24.97)	12 (24.97)	26 (13.98)	393 (22.42)	
Housing tenure status					714.14***
Homeowner	2,637 (70.56)	23 (8.78)	17 (9.14)	1,259 (71.82)	
Renter	1,100(29.44)	239 (91.22)	169 (90.86)	494 (28.18)	
Residential area					77.80***
Metropolitan area	1,479 (39.58)	92 (35.11)	87 (46.77)	492 (28.07)	
Non-metropolitan area	2,258 (60.42)	170 (64.89)	99 (53.23)	1,261 (71.93)	

*Note*. \*\*\* *p*<.001.

# Distribution of material hardship.

Table 3 presents the distribution of material hardship. As expected, the joint poor reported the highest number of hardship indicators (ranging from 0 to 11). The number of total hardship indicators was only 1.13 on average for the joint poor followed by the asset poor only (0.62) and the income poor only (0.32). Between the asset poor only and income poor only, the asset poor only experienced more of all forms of hardship than the income poor only.

# Table 3.

Variable	Non-poor (n=3,737)		Joint poor (n=262)		Asset poor only (n=186)		Income poor only (n=1,753)	
				N	(%)			
Food hardship	57	(1.53)	111	(42.37)	28	(15.05)	248	(14.15)
Food did not last	26	(0.70)	40	(15.27)	6	(3.23)	91	(5.19)
Not having balanced meals	50	(1.34)	110	(41.98)	26	(13.98)	246	(14.03)
Skipped meals/did not have enough to eat	5	(0.13)	10	(3.82)	2	(1.08)	20	(1.14)
Ate less than needed	7	(0.19)	17	(6.49)	3	(1.61)	32	(1.83)
Hungry but did not eat	2	(0.05)	6	(2.29)	1	(0.54)	12	(0.68)
Housing hardship	11	(0.29)	33	(12.60)	19	(10.22)	59	(3.37)
Eviction	4	(0.11)	19	(7.25)	19	(10.22)	9	(0.51)
Heating system	7	(0.19)	20	(7.63)	2	(1.08)	55	(3.14)
Utility hardship	33	(0.88)	41	(15.65)	37	(19.89)	51	(2.91)
Utility disconnect	0	(0.00)	8	(3.05)	2	(1.08)	3	(0.17)
Unable to pay for bills	33	(0.88)	41	(15.65)	37	(19.89)	51	(2.91)
Health hardship	17	(0.45)	23	(8.78)	16	(8.60)	52	(2.97)
Medical need	8	(0.21)	16	(6.11)	7	(3.76)	41	(2.34)
Lack of insurance coverage	10	(0.27)	9	(3.44)	10	(5.38)	15	(0.86)
				Mean	(SD)			
Number of total hardship	0.04	(0.33)	1.13	(1.67)	0.62	(1.27)	0.32	(0.97)

# Distribution of Material Hardship

#### The association of material hardship with households' poverty condition.

Table 4 shows the association between the household's poverty condition and hardship experience as estimated from five separate logistic regression models. As can be seen in Table 4, all three poverty groups had statistically significant associations with all forms of hardship experience. Of total hardship, the strongest poverty-related predictor was joint poverty. The odds of reporting total material hardship for this group was 12.90. Asset poverty only was the second strongest poverty predictor of hardship experience. The odds of reporting total hardship of this group was 9.45, compared with 4.88 of the income poor only. The pattern of association between poverty predictor and the specific forms of hardship was a little different from that of total hardship. Of housing and utility hardship experience, asset poverty only was the strongest poverty predictor. The odds of reporting housing hardship for this group was 25.45, and that of utility hardship was 21.86. Of food hardship experience, joint poverty was the strongest poverty predictor (*OR* = 12.98) followed by income poverty only (*OR* = 4.63) and asset poverty only (*OR* = 4.24).

Examining the association between hardship and households' socioeconomic characteristics, household size, number of workers, housing tenure status, and head's marital status and employment type were statistically significant predictors of total hardship experience. As the number of household members increased, households were more likely to experience hardship (OR = 1.35). On the other hand, an increase in the number of workers contributed to reduce the odds of hardship experience (OR = 0.63). Households whose heads were divorced, widowed or separated were more likely to experience hardship than households with married heads (OR = 1.82). Households headed by workers with precarious employment statuses as temporary worker or self-employed, were more likely to report hardship than those headed by permanent workers (OR = 2.38 and 2.08). Contrary to general expectations, unemployment had no statistically significant association with hardship experience. Homeowners were less likely to experience hardship than renters (OR = 0.31). The head's marital status, employment type, and home ownership were also found to be statistically significant predictors of specific hardship types. Interestingly, as the age of heads increased, households were less likely to experience utility or health hardship (OR = 0.96).

# Table 4.

Association	between	Asset	Poverty	and	Har	dship
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Variable	Total	Food	Housing	Utility	Health	
	OR					
Age	1.00	1.01	1.01	0.96**	0.96*	
Number of household members	1.35***	1.33**	1.05	1.27*	0.98	
Number of workers	0.63**	0.48***	0.61	0.89	0.85	
Male	0.83	0.80	0.99	1.04	0.83	
Marital status – Married						
Divorced/widowed/separated	1.82**	1.92**	2.16*	1.64	1.49	
Single	1.54	1.38	1.42	1.08	1.64	
Education level – Less than high school						
High school graduation	0.80	0.74	0.71	1.01	0.90	
Some college or higher	0.62	0.56	0.98	0.75	0.47	
Employment type – Permanent worker						
Unemployed	1.58	0.80	0.48	3.50*	4.44	
Temporary worker	2.38**	1.41	0.76	4.16**	5.77*	
Self-employed	2.08*	1.16	0.67	3.37**	4.44	
Housing tenure status – Renter						
Homeowner	0.31***	0.27***	0.20***	0.64	0.55	
Residential area – Metropolitan area						
Non-metropolitan area	0.91	0.89	0.71	0.68	0.86	
Poverty condition – Non-poor						
Joint poor	12.90***	12.98***	18.38***	16.73***	12.39***	
Asset poor only	9.45***	4.24***	25.45***	21.86***	11.88***	
Income poor only	4.88***	4.63***	8.42***	5.59***	8.13***	

*Note.* OR = odds ratio. Reference group is shown next to the variable name. See appendix C1 - C5 for the coefficient, standard errors and 95% confidence interval (CI) estimated from each logistic regression model.

\* *p*<.05, \*\* *p*<.01, \*\*\* *p*<.001.

# Discussion

The main goal of the present study is to explore the association of asset and income poverty with material hardship. Following Haveman and Wolff (2005), I classified the sample into the non-poor, joint asset-income poor, asset poor only, and income poor only. Interestingly, descriptive statistics show that the asset poor only had similar socioeconomic characteristics to the non-poor, with more than one worker per household, a high share of male heads, high education level, and high share of the employed. This finding suggests that asset poverty is not necessarily associated with traditional notions of marginal positions in society and reaches well into the middle class (Rank & Hirschl, 2010). However, the share of homeowners was higher in the income poor only than in the asset poor only. For the asset poor only, the share of homeowners was less than 10% while around 70% of the income poor only were homeowners. Considering that the income poor only was a relatively older age group (70s) than the asset poor only (50s), this finding reflects that more than 50% of the retirement age population lacked cash flow but owned their homes in Korea (Jin, 2013).

As hypothesized, the associations of poverty and material hardship were found to be statistically significant. Joint poverty (asset and income poor) was the strongest poverty predictor of total hardship experience. Compared to income poverty only, asset poverty only was the stronger predictor of hardship experience, with the exception of food hardship, even though the asset poor only had better socioeconomic status as indicated by higher education levels and higher share of the employed. There are two possible explanations for why the asset poor are more likely to experience hardship than the income poor. First, as described in the time horizon model by Heflin et al. (2009), food hardship is caused by difficulty in temporary income flow, but housing or health hardship may be the result of structural and long-term financial constraints including lack of assets. Second, the asset poor only are more vulnerable to material hardship than suggested by the income poverty measure. As demonstrated in earlier studies (e.g., Brady, 2003; Iceland & Kim, 2002; Townsend, 1979), a household's actual living condition is influenced by all types of economic resources including cash income, capital assets, employment benefits, public social services, and private transfer, which are unequally distributed in a society. Accordingly, the current income poverty threshold cannot capture the actual living conditions of the asset poor. Households who experience poverty only in assets not only lack capital assets, they are often ineligible for welfare benefits such as cash, education, housing, and medical benefits from the public assistance program in Korea because their household income is above the absolute poverty line (MLS in Korea). Moreover, the high share of temporary workers (40.86%) among the asset poor only implies that many of the asset poor only may be excluded from fringe benefits such as severance pay, bonus, overtime pay, and paid holidays offered by their employers. This finding affirms previous research revealing that income poverty measures underestimate the hardship condition of some working poor households (Berner, Ozer, & Paynter, 2008; Beverly, 2001a; Bradshaw & Finch, 2003).

Findings from the present study provide evidence that material hardship experience was not equally distributed across economic and socio-demographic groups. Household size, head's marital status and employment type, and home ownership were statistically significant predictors of household's hardship experience. Larger household size was significantly and positively associated with hardship experience. This is consistent with previous research showing that for low income households, larger household size was negatively associated with the likelihood of exiting income poverty (Ahn, Ku, & Lee, 2011; Noh, Won, Lee, & Park, 2009). As the number of household members increased, they were more likely to include dependent household members such as children, the elderly, and disabled dependents. Because of insufficient social support for these vulnerable groups in Korea (family expenditure was 0.99% of GDP in 2011; Koh et al., 2013), the financial burden was mostly concentrated on the dependent members in a household (Ahn et al., 2011; Lee & Ban, 2009). Consistent with previous research (Beverly, 2001a; Iceland & Bauman, 2007; Kim et al., 2015; Lee, 2011), non-married, the unemployed, temporary workers, the self-employed, renters, and the younger age group suffered more hardship. Households whose heads were divorced, widowed or separated were more likely to experience hardship than those with married heads. Given that two working adults are the best preventative measure against household poverty in present-day society (Lohmann & Marx, 2008), there is an increased likelihood of poverty in the single-headed households, especially female-single headed ones (Seccombe, 2000). In addition, child care responsibilities restrict the single-parent from actively participating in the labor market (Lee & Ban, 2009; Song & Yeo, 2010). As a result, in Korea, the asset poverty rate for non-married households measured by net worth was almost two times higher than that for the married ones (Suk, 2012).

Precarious employment status also increased the likelihood of hardship experience. Strikingly, being a temporary worker was a stronger predictor of hardship than being unemployed. This finding is consistent with previous studies revealing that working poor households sometimes were more vulnerable to material hardship than non-working poor households (Berner, Ozer, & Paynter, 2008; Beverly, 2001a; Lee, 2011). Working adults with low but above-poverty-level earnings have traditionally been ineligible for welfare benefits such as cash, medical, educational, and housing benefits. Moreover, heads with precarious employment status, similar to those in the US (Beverly, 2001a), are excluded from Korean national social insurance or fringe benefits from their employers. For example, in 2014, only 36.9% of temporary workers joined national pension insurance and 42.5% joined unemployment insurance in Korea (67.4% and 68.6% of permanent workers). In addition, while more than 80% of permanent workers received fringe benefits, only around 40% of temporary workers benefited (Statistics Korea, 2015c).

Households with older heads were less likely to experience utility or health hardship. This may have at least two explanations. First, the younger generation has suffered from greater housing expenses. In Korea, among renters, 31.9% dedicated 30% or more of their income toward housing in 2012, and 60% of them were aged 35-65 (Jin, 2013). High financial burden on housing means that it is difficult for households to make ends meet (Jin, 2013). For example, according to the Korean Survey of Household Income and Expenditure of 2015, for households whose heads were under 40, household expenditure on housing, utilities, and heating was \$20 to \$50 higher than that of other age groups. However, the household surplus ratio<sup>7</sup> of this group was lower than other age groups (26.9% compared to 28.1% on average in 2015; Statistics Korea, 2015a). Furthermore, the national health insurance coverage rate was lower for the younger generation than for the older age group. For example, while 63% of individuals aged over 65 benefited from the national health insurance, among individuals aged 20 to 44, less than 50% enjoyed the benefits (KMOHW, 2015). According to the KMOHW (2015), the main reason for this discrepancy between generations is that the national health insurance does not sufficiently cover medical expenses related to pregnancy, delivery, and children's diseases that may be a high financial burden on the younger generation. It is important that social welfare policymakers better understand that certain groups such as the unmarried, temporary workers, and younger

<sup>&</sup>lt;sup>7</sup> The household's surplus is calculated by subtracting final household consumption expenditures from disposable income. The household surplus ratio is expressed as a percentage of disposable income.

people are quite vulnerable to hardship because they are excluded from the labor market and/or social protection schemes.

#### **Research Limitations and Implications**

Findings from the present study provide a number of implications for future social welfare research. First, since there is no universal consensus, hardship measures in empirical studies have varied in their definitions of basic consumption needs. Most empirical studies in the US, UK, and Korea have used hardship indicators that assess the minimum levels of goods and services including food, housing, utility, medical care, and consumer durables. However, these hardship measures are only useful for estimating absolute poverty conditions, not relative poverty across wide ranges of time or between different nations and cultures (Townsend, 1979). In consideration of the 'relativity' of poverty within a specific context, Townsend identified the poor if they lack resources to obtain the living conditions standard in their own particular time, place, and culture. He suggests standard of living indicators ranging from diet, clothing, housing and housing facilities, and consumer durables, to holidays, recreation, family support, health and social relations, and claims that the standard of living is influenced by national government, education, the mass media, industry, and transport systems in different societies (Townsend, 1979). Inspired by Townsend's work (1962, 1979), the European Union (EU) defined the poor as people whose resources are so small as to be excluded from the minimum acceptable way of life in the condition in which they live (Eurostat, 2012). To measure poverty based on this definition, in 2009, the Eurostat (2012) developed material and social deprivation indicators that cover key aspects of living conditions across the countries of the EU. Material deprivation indicators include basic amenities available in the dwelling, the dwelling's local environment, and other elements related to living conditions. Social deprivation indicators concern holidays, celebration, leisure, and contact with family and friends (Eurostat, 2012). In the present study, due to data availability, I used 11 hardship indicators of basic consumption needs. However, findings indicate that only a small portion of households (around 10% of the analytic sample) experienced any of the types of hardships considered. It implies that in Korea, most households had an actual consumption level above their basic needs. However, the high relative income poverty rate in Korea (14.6% in 2013, compared to the average OECD rate of 11.2%; OECD, 2016) implies that poverty does affect a significant portion of households. Considering that poverty is necessarily defined in relation to the social structure and level of development of a particular society (Atkinson, 1975), future poverty research should expand the hardship measures to encompass more living conditions such as issues of dwelling environment and facilities, including noise, pollution, crime, and overcrowding, as well as social deprivations.

In the present study, I have estimated material hardship in the poor population as a whole. However, prior research has found substantial subgroup variation in reported material hardship among poor populations (Edin & Lein, 1997; Siebens, 2013). For example, in Siebens (2013), the number of hardship experiences varied significantly by household income quintile. Households in the lowest income quintile were three times as likely to report having one difficulty and more than five times as likely to report three or more difficulties of hardship as households in the highest income quintile. Given these noted differences, the hardship experience reported here may differ across subpopulations. Specifically, it will be important to understand differences across the income and asset distributions by examining segments in the distribution such as quintiles. Examining this variation will contribute to a richer understanding of the association between material hardship and poverty status, and help the policy community create more effective tools to improve household living conditions.

#### **Policy Implications**

The present study suggests that the living conditions of the poor are affected by various types of economic resources and socioeconomic characteristics. Thus, policy responses to poverty should vary according to the household conditions (Bradshaw & Finch, 2003). First, the present study revealed that lack of assets, especially lack of net worth, substantially increased the probability that a household would experience hardship. It suggests that multiple savings programs are needed to provide asset-building opportunities to the asset poor to confront their economic hardship (Boshara, 2005). Although nationwide asset-building programs such as the Hope Growing Account program (Hope)<sup>8</sup> have been introduced in Korea, these programs restrict participation to low income households whose income is below or near the absolute poverty line (MLS). Thus, some asset poor cannot benefit from these structured and subsidized saving opportunities. In addition, the asset poor lack various non-income economic resources. As mentioned previously, many of the asset poor may be ineligible for welfare benefits because of low but above-poverty-level earnings, and excluded from social insurance or fringe benefits due to their precarious employment status. Therefore, to support this group, policymakers could consider more ambitious and universal asset-based interventions (Sherraden, 2003). For example, matched savings schemes might be used to complement the existing social security system in Korea. Individual Retirement Accounts (IRAs) in the US, Employees Provident Funds (EPF) in Malaysia, and Unemployment Insurance Savings Accounts (UISAs) in Chile, which combine savings and social insurance objectives, are good examples of these. Policies could follow these models, but limit qualified beneficiaries to temporary workers or informal workers and add a progressive government matching scheme.

<sup>&</sup>lt;sup>8</sup> I detailed the Hope program in the first and fourth chapters of this dissertation.

Next, the present study found that home ownership was associated with a statistically significant decrease in the likelihood of hardship experience. However, in Korea, only 10.8% in the bottom quintile of asset distribution are homeowners, while 83.2% at the top quintile are (Statistics Korea, 2015d). In addition, because of rising rents, the relative financial burden of housing expenses has tended to rise over time. For example, household actual expenditure on housing has increased by 10.3% between 2015 and 2016 (Statistics Korea, 2016). In light of this, a more extensive and progressive policy, such as Singapore's Central Provident Fund (CPF), is needed to encourage home ownership in Korea, especially for the younger generations.

Lastly, as shown in the present study, the income poor only, especially the relatively older age group, were likely to have difficulties in cash flow although they had their homes. Considering that Korea has an elderly income poverty rate of 49.6%, the highest among OECD countries (the OECD average was 12.6% in 2012; OECD, 2016), policy is needed to mitigate the elderly income poverty rate by leveraging their real estate. For example, in Korea, there is a government-guaranteed reverse mortgage program for the elderly who own property but do not have adequate cash flow for their post-retirement lives. They can receive monthly loan payments extracted from their home equity. Currently, middle and high-income households benefit most from this program, and it needs to be expanded to benefit low- and moderate-income households (Jin, 2013; Suk, 2012).

#### Chapter 4

# The Impact of the Hope Growing Account Program on Participants' Economic Well-being Abstract

In 2010, the Korean government introduced the Hope Growing Account (Hope) program. Hope combines elements of its social assistance scheme (monthly income grant) with matched funds for saving to encourage the working poor to increase income and build assets. Hope is available to working households receiving the National Basic Livelihood Security (NBLS) benefits. This longitudinal study estimated changes in household economic well-being among 895 low-income households who participated in Hope between 2010 and 2012. Economic well-being was measured by changes in household monthly income and income-to-needs ratio. This study used the propensity score matching (PSM) and difference-in-differences (DID) to remove internal validity threats, and revealed three major findings: (a) the impact of Hope varied over household income distributions; (b) lower income households were more likely to increase their monthly earned income and income-to-needs ratio compared to demographically similar nonparticipants, while higher income households were less likely to increase their income and income-to-needs ratio; and (c) among the Hope participants, those who were single, resided in non-metropolitan areas, or had higher earned income in 2010 were less likely to increase their earned income and income-to-needs ratio two years after the program. This finding suggests that incentives provided in Hope helped some but not all participants increase earnings and improve their income poverty status. I describe how future research is needed to better understand how the Hope program impacts a household's assets and behavioral changes in the long-run. To more effectively address poverty, the Hope program might consider lowering its income eligibility to allow for more low income households joining the program. Furthermore, I suggest targeted and "just-in-time" case management to target other non-income aspects of social development.
In most countries, policy efforts to reduce economic insecurity have traditionally focused on transferring income to meet basic consumption needs. Income transfers include targeted mean-tested and universal benefits that take the form of cash or in-kind delivery. While transfers lift many households out of poverty, researchers and policy makers have questioned how well transfers reduce poverty levels in the long-term. To complement income transfer programs and address long-term poverty, asset-based policies have been introduced to encourage individuals to accumulate, hold, and develop assets rather than simply maintain their basic livelihood at the poverty level (Loke & Sherraden, 2009; Sherraden, 2003).

The US based Individual Development Account (IDA) is one of the most typical assetbased interventions. The IDA is a type of matched-savings program that encourages low-income families to save toward specific goals such as education, home ownership, and entrepreneurial activity (Sherraden, 1991). While it was first proposed by Sherraden (1991) as a lifelong and universal account structure, the U.S. federal and state governments began to adopt targeted versions of the IDA in the late 1990s (Sherraden, 2000). Since the IDA was first introduced in the US, many other countries including the UK, Taiwan, and Korea have experimented with similar asset-building programs.

The introduction of asset-based interventions in Korea was closely linked to policy interest in Korea's self-support programs, welfare programs introduced in the late 1990s that promote popular participation in economic activity. In response to the Asian Financial Crisis of 1997, Korea underwent a neoliberal reformation that loosened controls on employers and increased labor mobility while decreasing job security within the market. Consequently, people laid off during the crisis were placed into low-wage jobs. Under neoliberalism, most affluent Western countries cut their welfare expenditure (Andress & Lohmann, 2008). In contrast, since the 1997 crisis, the Korean government has enhanced Korea's social security system to address a significant rise in the poverty rate. In this policy environment, the government incorporated welfare policy into economic policy by expanding its investment in self-support programs including Active Labor Market Policies (ALMPs) and asset-building programs (Keum, 2006; Kim, Zou, Joo, & Sherraden, 2011; Noh, Hong, Choi, Jun, & Park, 2009). Since the first nationwide matched savings program, Didim Seed Account, was implemented in 2007, assetbased policies have been notably expanded in Korea. In 2010, the Korean Ministry of Health and Welfare (KMOHW) introduced another such initiate: the Hope Growing Account (Hope) program. The Hope program is a nationwide matched-savings program intended to help working poor households exit poverty by increasing their income and promoting asset accumulation (Choi, Han, Choi, & Park, 2010). It targets the working poor whose household income is below the absolute poverty line as defined by the national minimum living standard (MLS). Participants in Hope identify a savings goal and make regular deposits into a designated account. Approved savings goals include education expenses, housing fees, or opening a small business. Individual contributions to the account are then matched at a 1:1 rates by public funds. In addition, a monthly earned income grant is offered to incentivize work. In recent years, Hope has expanded three-fold, the number of participants increasing from 10,000 households in 2010 to 32,000 in 2014. In addition, public expenditures on the program increased from approximately \$22 million in 2010 to \$43 million in 2014 (KMOHW, 2015).

Despite the program's expansion, the impact of Hope participation on participants' lives is not well understood. The purpose of this third study of my dissertation is to better understand the impact of the Hope program by estimating Hope's influence on household economic wellbeing between 2010 and 2012. More specifically, I take a longitudinal approach to examine changes in earned income and income poverty status among working poor households enrolled in the Hope program, in comparison to a demographically and socioeconomically similar group of non-participants. Most prior research on IDA program evaluation has focused on the participant's saving performance such as the savings amounts and saving regularity. Moreover, stakeholders and policymakers are also interested in understanding Hope's impact on broader dimensions of household economic well-being including income and income poverty status. The interest in income outcomes is rooted in the premise that Hope, by offering an earned income grant, goes beyond the typical IDA goal of promoting savings to also encourage increases in income. The present study is, to my knowledge, one of the first studies to examine the impact of Hope participation on household income and income poverty status.

#### **Asset-based Policies in Korea**

Korea has introduced a handful of asset-building programs that are loosely based on the IDA. First is the *Didim Seed Savings Account* that was initiated in 2007, a nationwide Children Development Account (CDA) that targets institutionalized children (Loke & Sherraden, 2009). Second is the *Hope Plus Account* initiated by the Seoul Metropolitan Government in 2008, an IDA-type account targeting working poor households under 150% of the national MLS (Han & Kim, 2014). Last is the *Hope Growing Account*, a nationwide asset-building program introduced in 2010 that is available to households receiving the National Basic Livelihood Security (NBLS) benefits and whose earned income is more than 60% of the MLS<sup>9</sup> (Kim, Zou, Weon, Sherraden, & Choi, 2016). The Hope Growing Account (Hope) is the focus of this study<sup>10</sup>.

<sup>&</sup>lt;sup>9</sup> The MLS is the basis for NBLS eligibility rules and benefits calculation.

<sup>&</sup>lt;sup>10</sup> The most recently introduced asset-based intervention in Korea is the Hope Growing Account II (Hope II). To avoid confusing with the Hope program (the focus of this study), I do not illustrate the Hope II in this chapter. A description of the Hope II can be found in the first chapter of this dissertation.

### The Hope growing account.

Hope aims to encourage working poor households to exit poverty by increasing their earned income and promoting asset accumulation. To achieve these goals, Hope participants make monthly saving contributions, either \$50 or \$100, and these contributions are matched by public funds. Three years after joining Hope, participants are allowed to withdraw their accumulated assets to realize specific savings goals such as housing, education expenses, or micro-enterprise investment. Hope is based on the institutional theory of savings, which postulates that seven institutional constructs promote saving and asset accumulation: access, information, incentives, facilitation, expectations, restrictions, and security (Beverly et al., 2008). An example of access in the Hope program is that participants can arrange automatic transfers so that savings deposits are transferred automatically into their Hope accounts once a month. In addition, participants are notified monthly of the total amount of their savings via cell phone texts. To enhance savings performance, the Hope program provides financial education and case management with help from community partners including local offices of the Credit Counselling and Recovery Service (CCRS) and self-sufficiency centers. Comparable to the federal IDA programs in the US administered by the Assets for Independence Act, matched funds may only be applied towards approved savings goals. Participants are required to document how they use the saved funds to meet their approved saving goals.

Two main features make Hope unique and of particular interest to social welfare scholars. First, Hope is directly tied to the social security system of Korea via program eligibility. Only persons receiving NBLS welfare payments and whose earned income is more than 60% of the MLS are eligible to participate in Hope. This contrasts with asset-building programs in the US, which typically target persons under 200% of the federal income poverty level. After program completion, to receive the total amount of their accumulated assets, participants must exit the NBLS. If they remain on the NBLS, they receive only their deposits plus interest (Kim et al., 2016). The income restriction and requirement of Hope is intended to focus program benefits on those who have a greater potential for exiting poverty, and motivate them to increase their income above the absolute poverty line (MLS; Choi et al., 2010). Although they exit the NBLS during Hope program participation, they could stay in the Hope program as long as their income remains under 150% of the MLS. While normally NBLS recipients stop receiving welfare benefits such as cash, housing, education, and medical benefits after leaving the NBLS, the Hope participants continue receiving the education and medical benefits for three years after termination of NBLS. This is aimed at alleviating the financial burden of education and medical expenses after participants leave the NBLS (Choi, Han, & Choi, 2012).

Second, and more substantively, Hope provides a structured incentive to increase earnings from employment. The incentive takes the form of a matching mechanism called the earned income grant. The earned income grant encourages participants to increase labor market participation, and thus is aimed to counter the disincentive to employment inherent in the NBLS policy. The precise earned income grant incentive is a complex calculation based on multiplying the difference between monthly earned income and 60% of MLS by 1.05. For example, imagine that a head of household on the NBLS receives a raise of \$10 per month, from \$800 to \$810. Under current NBLS rules, this person would lose cash benefits at a 1:1 rate equivalent to the income gained. The NBLS policy has been criticized as a poverty trap and disincentive to increasing income (Kim et al., 2008). In contrast, a Hope participant who experienced the same \$10 increase would receive an income grant benefit of \$10.5 (from \$158.97 to \$169.47). Furthermore, if he or she saved \$100 a month in the Hope account, \$369.47 in total would be saved a month in his or her Hope savings account: \$100 in his or her own savings, \$100 in matching funds from the Korea welfare foundation, and \$169.47 in the form of the earned income grant funded by the Korean Government. According to the KMOHW (2015), the average monthly earned income grant in 2014 was \$290 a month, which means that a participant who saves \$100 a month could save a combined \$14,000 from their savings and the grant in three years on the Hope program. The earned income grant structure of the Hope program was designed to follow the cash benefit reformation model established by Kim et al. (2008). As such, the institutional architecture of Hope is hypothesized to have a positive influence on both savings and income. Figure 1 illustrates the key parts of the Hope program.

Inputs		Outpu	ís 📃		Outcomes - Impact			
	7	Activities	Participation		Short	Medium	Long	
E. I.		W	Y	1	T	Treeland	<b>F</b> :4	
Funding		(Earned income grant)	households		earned income	acquisition	poverty	
Staff		Saving incentive (Matched funds)			Increased savings in Hope	Increase investment in housing, education	Enhance self- sufficiency	
Research Base		Three years education & medical benefits			account	or business		
Community Partners		Financial literacy (Information & education)						
Existing Resources		Case management						

Figure 1. Logit model of Hope Growing Account (Hope) program

### **Background Studies**

Asset-building programs such as IDAs originated from social development theory. From a social development perspective, individuals, even those at the bottom of the socioeconomic ladder, are seen as being actively involved in shaping their own destiny, as long as they are offered adequate social and economic opportunities (Sen, 1999). This theory holds that assets play an important role in promoting the general capacity of individuals to advance economically, socially, psychologically, and politically, and to achieve goals beyond the mere satisfaction of consumption needs (Nam et al., 2008; Sherraden, 1991). Advocates of asset-building programs argue that structured and subsidized savings programs including the IDA positively affect participants' assets, income, economic activity, poverty status, and attitudes toward the future (Lerman & McKernan, 2008; Rohe, Gorham, & Quercia, 2005; Sherraden, 1991). Some empirical research supports this idea. Using the longitudinal panel data from the American Dream Demonstration (ADD), Huang (2010) revealed that IDA program participation changed household savings behavior, financial habits, and attitudes. In addition, Huang (2010) found a statistically significant increase in IDA participants' non-IDA household financial assets such as cash, savings, stocks, and bonds. Rothwell (2011) compared IDA participants to non-IDA participants and found some evidence that IDA participation led to an increase in net worth (total assets minus total liabilities). Based on his findings, Rothwell (2011) suggests that the high net worth gains from the IDA are likely explained by increased home ownership over time. Han, Grinstein-Weiss, and Sherraden (2009) also found that after excluding extreme cases, IDA participation significantly increased participants' real non-liquid assets such as real estate and nonfinancial assets (e.g., vehicles) as well as total assets (real assets, nonfinancial assets, and financial assets excluding IDA savings). Using the cross-sectional survey from current and

former participants in the ADD, Moore et al. (2001) found that the IDA encouraged participants to increase their work efforts. Of the total sample, 59% were more likely to work or stay employed as a result of having the IDA. Moreover, 41% answered that they increased their working hours and 61% reported that IDA participation had made them more likely to try to increase their income.

Scholars of behavioral economics also pay particular attention to the effects of savings on people's economic status. Behavioral theory hypothesized that existing income-based welfare programs to maintain basic needs can make people feel worthless and lower people's expectations of themselves. It suggests that savings programs, on the other hand, can build selfesteem, which improves not only savings account take-up, but also household income, expenditures, and wealth (Bertrand, Mullainathan, & Shafir, 2004; Karlan, Ratan, & Zinman, 2014). Empirical evidence shows that subsidized or commitment savings programs for the poor in low- and middle-income countries improve participants' economic status by promoting their productive investments in business, health, and education (Carvalho, Prina, & Sydnor, 2016; Dupas & Robinson, 2013a, 2013b; Schaner, 2016). Using a field experiment in rural Kenya, Schaner (2016) suggests that high-powered incentives to save can have persistent impacts on household income increases even when all subsidies are short-term. Schaner (2016) explains that the high subsidy motivated respondents to make financial decisions for the future, and these decisions helped study participants continue investing in their businesses even after the program expired. Following their field experiment in Kenya, Dupas and Robinson (2013a, 2013b) found that introducing a simple saving device that restricted withdrawal led to a significant increase in deposits and in investment in preventative health and small business.

### Impact of asset-based intervention in Korea.

In Korea, several studies have revealed the positive effects of savings programs on participants' economic status. In their longitudinal panel study of the Hope program, Choi et al. (2012) revealed that one year after enrolling in the program, there was a substantial increase in the share of participants (62.3% in 2010 to 71.5% in 2011) who reported that they were more likely to increase their earned income because of Hope. In addition, more than 70% of participants answered that they would save regularly after the program expires and around 24% reported that they would save irregularly, when they could afford to. Choi et al. (2012) also showed a statistically significant increase of \$30 in the earned income credit of Hope participants between 2010 and 2012, which indicates that there was a significant increase in their income and Hope savings during the same period.

Empirical evidence shows that the Hope Plus Account program by the Seoul Metropolitan Government also positively affected participant's economic status. Kim, Lee, and Sherraden (2012) evaluated the impact of the Hope Plus Account program in the Seoul City by comparing changes in economic and demographic characteristics, savings outcome, and economic conditions of participants with those of nonparticipants between 2009 and 2011. In their preliminary findings, Kim et al. (2012) showed that at the third wave of 2011, a larger share of IDA participants reported that their economic condition improved following the program and they felt hopeful about their future economic conditions. Kim et al. (2012) also showed that participants' total household annual income increased substantially by \$245 between the first wave of 2009 and the third wave of 2011. At the third wave, total household yearly income was around \$4,600 higher for the program participants than for the nonparticipants.

### Limitations of previous research.

The applicability of findings from this research are limited to analysis of the impact of Hope program due to several limitations. First, two unique features embedded in the Hope program may influence the direction or magnitude of the program's effects: the earned income credit and program eligibility. Hope's earned income credit is expected to produce an observable impact on household income and income poverty status. In addition, the Hope program restricts its participants to NBLS recipients, in contrast to many other asset-building programs that target low income households whose income is under 150-200% of the official income poverty line. These two features distinguish the Hope program from many other asset-building programs.

Next, much of the previous research on IDAs, including research on the Hope program, has heavily relied on a single-group pre-test and post-test design. The single group research design requires a strong assumption that there will be no difference in outcomes between the treatment and non-treatment (comparison) groups in the absence of the treatment (Meyer, 1995). For example, if not for the Hope program, the two groups would have had a similar income poverty status and increase in household earned income. However, this assumption may be violated due to selection bias occurring across groups. Selection bias across groups can occur if treatment and comparison groups differ with respect to covariates, aside from Hope program participation, that are also related to trends in outcomes across time (Stuart et al., 2014). As revealed by previous research, people who voluntarily choose to participate in asset-building programs may already be more inclined to save and more self-sufficient than nonparticipants (Fry, Mihajilo, Russell, & Brooks, 2008). In addition, participants in asset-building programs including Hope disproportionately consist of females, single individuals, urban area residents, full-time workers, and higher-educated groups when compared to the general low-income

population eligible for asset-building programs (Choi et al., 2010; Rohe et al., 2005; Rothwell & Han, 2010; Schreiner et al., 2005). By overcoming these empirical and methodological limitations of previous research, this study estimates the impact of the Hope program on participants' economic well-being (household monthly income and income poverty status) in comparison with that of nonparticipants between 2010 and 2012.

### **Research Questions**

My research here builds on and advances existing knowledge on the impact of assetbuilding programs in at least two ways. First, I have implemented a two-group quasiexperimental research design that addresses some of the limitations in previous research on asset-building programs including Hope. Specifically, I compare changes over time in a Hope participant group with changes over time in a non-participant group with similar socioeconomic characteristics. Second, in light of economic benefits from the asset-building program based on development theory, and the institutional features of Hope described above, I would expect the Hope program to produce an observable effect on household economic well-being including income and income poverty status.

Furthermore, in estimating the impact of the Hope program, I explore the consequences of sample attrition. In my analysis sample, around 34% of Hope participants left the program within two years. There is a risk that when using a panel dataset to estimate the program's effect, the results will be contaminated by attrition bias (Contoyannis, Jones, & Rice, 2004; Han et al., 2009). Failing to account for attrition may result in misleading estimates of the program's effects (Contoyannis et al., 2004).

Consequently, this research is guided by the following questions: (a) To what extent does the Hope program impact participants' household monthly income? (b) To what extent does the Hope program impact participants' income poverty status? (c) Which Hope participants benefit the most? (4) To what extent does sample attrition influence the impact of the Hope program? **Method** 

## Source of data.

Data on Hope for this study came from two sources. First, I accessed data from the Hope panel study (Choi et al., 2010). This set of longitudinal panel data contains 1,604 households who started the Hope program between April and June of 2010. This sample group was selected by a stratified random sampling method that considered the region where participants lived. Among 1,604 households in the original sample, 1,489 opened Hope accounts and commenced saving in 2010. These 1,489 households were analyzed in this study. The Hope panel study collected detailed information about participants' socio-demographic and economic characteristics, such as earned income sources, employment status, consumption level, housing ownership, and psychological characteristics as gathered from interviews with program participants (or their household members) since 2010 (Choi et al., 2010). In addition, I accessed administrative data on participants' earned income from the monthly report issued by the bank that managed Hope savings accounts between 2010 and 2012. These data sets are not open to the public. I had several meetings with Dr. Choi (the primary investigator of Hope panel study) and the KMOHW and received permission to access the data. All data were anonymized (individuals were coded using random numbers) and provided from Dr. Choi and the KMOHW. I received ethics approval to use these data resources from the Research Ethics Board at McGill University (REB II reference # 288-1215).

A comparison group was formed using the 6<sup>th</sup> and 8<sup>th</sup> wave of the Korean Welfare Panel Study (KOWEPS). I examined two waves of the KOWEPS to gather information on the sociodemographic characteristics and monthly earned income of low-income households in 2010 (6<sup>th</sup> wave) and 2012 (8<sup>th</sup> wave). Households in the comparison group had the same earned income level as Hope participants (between 70<sup>11</sup>% and 100% of the MLS) in 2010, but did not participate in Hope (the KOWEPS survey asks about Hope participation). Consequently, 224 households were analyzed as a comparison group.

### Measurement.

### Dependent variable: household economic well-being.

In the present study, I measured household economic well-being by monthly earned income and income poverty status. Household monthly earned income was measured by changes in household average monthly earned income between 2010 and 2012. I adjusted the 2012 income value in accordance with the Consumer Price Index (CPI) to account for inflation, and I converted the 2010 and adjusted 2012 income values into US dollars (1 USD:1,000 KRW). Following Mills et al. (2008), I measured household income poverty status by income-to-needs ratio, specifically the ratio of household earned income to the appropriate income poverty threshold (MLS) for each year. In the second study of this dissertation (the third chapter), I used 150% of the MLS as the income poverty measure. In the third study, however, I used 100% of the MLS to measure income-to-needs ratio. The reason for this different measure is that Hope intends to motivate its participants to increase their income above the absolute poverty line (MLS) by way of its requirement of leaving the NBLS to receive the total amount of accumulated assets.

<sup>&</sup>lt;sup>11</sup> The KMOHW mitigated Hope's income eligibility from 70% of the MLS to 60% in August 2010. Households in my sample group enrolled in Hope in April and June of 2010 before the program eligibility was changed.

## Conditioning variables.

Hope program impact was estimated by comparing the dependent variable between Hope participants and a matched sample of non-participants. I used propensity score to remove the imbalance of observed covariates between the treatment and comparison groups drawn from two different data resources. The propensity score for subject i (i=1, ..., N) is defined as the conditional probability of assignment to a particular treatment versus non-treatment, given a vector of observed covariates (Guo & Fraser, 2010). Thus, in calculating the propensity score, the choice of covariates hypothesized to affect the probability of treatment receipt serves an essential role. In the present study, the propensity score can be defined as the conditional probability of participating in the Hope program given conditioning variables. That is, subjects with the same propensity score had the same probability of participating in the Hope program. I chose the conditioning variables based on a review of literature on the characteristics of IDA participants. Many empirical studies in the US and Korea have shown that IDA participants are disproportionately female, single, urban residents, full-time workers, and higher-educated when compared to the general low-income population eligible for IDAs (Choi et al., 2012; Grinstein-Weiss, Yeo, Despard, Casalotti, & Zhan, 2010; Kim et al., 2012; Rohe et al., 2005; Schreiner et al., 2005). Referring to these empirical studies, I chose 11 socio-demographic characteristics of households and household heads at baseline as conditioning variables to predict the propensity score. They are described in detail below.

Characteristics of households

I included the following household-level variables: number of household members, number of workers, and earned income in 2010 (i.e., when commencing the program) as

continuous variables; residential area (metropolitan and nonmetropolitan area) and housing tenure status (homeowner and renters) as dummy variables.

## Characteristics of household heads

I used the following individual-level variables: age as a continuous variable; and gender (female and male), marital status (married, divorced/widowed/separated, and single or never married), education level (less than high school degree and high school graduation or higher), self-rated physical health condition (poor, fair, and good), and employment type (unemployed, self-employed, temporary, and permanent worker) as dummy or categorical variables.

## Analytical plan.

Because observations in the treatment and comparison groups were not randomly assigned in my analysis sample, there may exist several internal validity threats. For example, selection bias may be present if there is a correlation between assignment of observations to treatment group and outcomes in the absence of treatment (Meyer, 1995). In this study, among low income households, those who applied for the voluntary Hope program are assumed more likely to be self-sufficient. Thus, Hope participants may be those among the low income population with the greatest capacity to increase their income. In addition, differences in definitions or survey methods may change the measured outcomes and lead to a bias from mismeasurement. In this analysis, mismeasurement bias may arise from the different income resources of the treatment and comparison groups. While it is expected that the treatment group would accurately report their income to gain the Hope earned income credit, the comparison group from the KOWEPS survey, lacking such an incentive, might have underreported their earned income. Lastly, events aside from the treatment (the Hope program), occurring between pre- and post-intervention observations, called omitted variables, could provide alternative explanations of the results (Meyer, 1995; Ryan, Burgess, & Dimick, 2015; Stuart et al., 2014).

## Propensity score matching (PSM) and difference-in-differences (DID) model.

To reduce the internal validity threats mentioned above, I implemented the propensity score matching (PSM) and difference-in-differences (DID) model. The DID approach is frequently used to estimate the causal effects of interventions by comparing changes over time in a group unaffected by the intervention (a comparison group) with changes over time in a group exposed to the intervention (a treatment group; Meyer, 1995; Stuart et al., 2014). The key idea behind this approach is that there may be time-invariant differences in overall means between two groups, and DID model is designed to factor out these time-invariant differences. Accordingly, the DID model contributes to reducing the influence of other law or poverty programs (omitted variables) and differences in surveyors' methods (mismeasurements), and provides less biased effect estimations (Meyer, 1995). In my setting, the DID model measures the unbiased causal effects that the Hope program (treatment) has by emulating a comparison group that experiences the same trends in earned income or income poverty status that the treatment group would have experienced had they not participated in the Hope program (Stuart et al., 2014). I incorporated the PSM with the DID model to address sources of selection bias (substantial differences between Hope participants and non-participants that would affect their trends in earned income or income poverty status over time) in this study.

In sum, this analysis was conducted with the following steps: (a) estimation of a logistic regression to predict the probabilities for all observations, (b) creation of a logit score by using the predicted probability and defined the logit as the propensity score, (c) matching 1:1 nearest neighbor method within a caliper of  $0.25\sigma$  that provided the best balance of measured covariates

among several propensity score analysis techniques (e.g., matching within different caliper size and propensity score weighting), and (d) calculation of the DID estimates using a balanced sample. Furthermore, extending the traditional DID model, I estimated the quantile treatment effects (with 10<sup>th</sup>, 25<sup>th</sup>, median, 75<sup>th</sup>, and 90<sup>th</sup> percentile). This tests the heterogeneity of Hope program's impact across the income distribution. Because individuals at different positions within the initial overall income distribution may differently respond to policies, quantile treatment effects can provide a complete picture of the policy effects (Carneiro, Hansen, & Heckman, 2002).

Next, I implemented a within-group quantile regression (with 10<sup>th</sup>, 25<sup>th</sup>, median, 75<sup>th</sup>, and 90<sup>th</sup> percentile) of changes in monthly earned income and income poverty status (income-toneeds ratio) between 2010 and 2012, in order to identify the factors that influence the ability of participants to increase income and income poverty status in Hope. A quantile regression model can be used to characterize the entire conditional distribution of a dependent variable given a set of covariates. In addition, quantile regression is more robust to non-normal errors and outliers (Buchinsky, 1998).

#### Results

#### Sample attrition.

Of 1,489 households in the treatment group, only 65.75% (979 households) remained in Hope two years after the program began (December 2012); 34.25% (510 households) left the program. Households that left were excluded from this analysis. As shown in Table 1, there were no statistically significant differences (p < .05) in most socioeconomic characteristics between groups (stayers and leavers) except that the stay group had a statistically significant higher proportion of the self-employed people and homeowners, and a lower proportion of single

people.

# Table 1.

Characteristics of Stayers and Leavers in the Hope Program

Variable	Leavers	Stayers	Test	
	( <i>n</i> =510)	( <i>n</i> =979)	Statistic	
	M (SD)	M (SD)		
Number of household members	3.18 (1.13)	3.22 (1.10)	-0.50	
Number of workers	1.22 (0.53)	1.25 (0.56)	-0.99	
Monthly income in 2010 (US\$)	930.93 (252.19)	952.96 (238.39)	-1.59	
Age	44.75 (7.95)	45.30 (6.79)	-1.39	
	N (%)	N (%)		
Male	174 (34.32)	342 (35.01)	0.07	
Marital status				
Married	133 (26.92)	285 (29.87)	1.38	
Divorced/widowed/separated	320 (64.78)	616 (64.57)	0.01	
Single	41 (8.30)	53 (5.56)	4.04*	
Education level				
Less than high school	141 (27.92)	303 (31.40)	1.90	
High school degree or higher	364 (72.08)	662 (68.60)		
Self-rated physical health				
Poor	162 (32.21)	290 (30.33)	0.54	
Fair	128 (25.45)	232 (24.27)	0.25	
Good	213 (42.35)	434 (45.40)	1.24	
Employment type				
Permanent worker	134 (26.59)	273 (28.23)	0.45	
Unemployed	36 (7.14)	50 (5.17)	2.34	
Temporary worker	312 (61.90)	571 (59.05)	1.13	
Self-employed	22 (4.37)	73 (7.55)	5.56*	
Housing tenure status				
Homeowner	22 (4.35)	80 (8.20)	7.70**	
Renter	484 (95.65)	896 (91.80)		
Residential area				
Metropolitan area	308 (60.39)	638 (65.17)	3.30	
Non-metropolitan area	202 (39.61)	341 (34.83)		

*Note.* \* *p* < .05. \*\* *p*< .01.

### Sample characteristics.

Table 2 presents sample descriptive statistics and logistic regression models for predicting the propensity score. In this analysis, only the 979 households that stayed in the Hope program until December 2012 were considered. After excluding samples that did not have a propensity score due to missing values in covariates, 895 households were analyzed. For the comparison group, I restricted the sample to 224 households that had the same income level as Hope participants but did not participate in the Hope program.

Findings from bivariate tests (chi-square for the categorical variables and *t*-tests for the continuous variables) in the original sample showed that most covariates, except for the number of workers, single marital status, and poor self-rated physical health condition, were significantly different before the propensity score. This indicates that the covariate distributions for the treated and non-treated subjects did not overlap sufficiently. The observed differences make it necessary to remove imbalance between two groups using the propensity score. The treatment group was in better general economic condition than the comparison group, with a larger family size, higher average household monthly earned income in 2010 and 2012, higher education level, and higher share of the employed. However, the share of homeowners was higher in the comparison group than in the treatment group.

## Table 2.

Sample Description and Logistic Regression Model Predicting Propensity Scores (PS)

Variable	Comparison ( <i>n</i> =224)	Treatment ( <i>n</i> =895)	Test statistic	OR
	M (SD)	M (SD)		
Number of household members	2.31 (1.22)	3.21 (1.10)	-10.59***	3.68**
Number of workers	1.21 (0.65)	1.26 (0.57)	-1.00	1.75
Monthly income in 2010 (US\$)	771.34 (308.21)	949.48 (236.88)	-9.43***	1.00*
Monthly income in 2012 (US\$)	1002.73 (973.66)	1099.11 (304.72)	-2.51*	
Age	61.29 (12.31)	45.31 (6.78)	26.12***	.89***
	N (%)	N (%)		
Gender - Male	135 (60.27)	305 (34.08)	51.50***	.88
Marital Status				
Married	123 (54.91)	265 (29.61)	50.64***	
Divorced/widowed/separated	84 (37.50)	582 (65.03)	56.35***	3.10**
Single	17 (7.59)	48 (5.36)	1.62	.62
Education level				
Less than high school	163 (72.77)	282 (31.51)	127.33***	
High school degree or higher	61 (27.23)	613 (68.49)		1.03
Self-rated physical health				
Poor	71 (31.70)	268 (29.94)	0.26	
Fair	72 (32.14)	218 (24.36)	5.66*	.57*
Good	81 (36.16)	409 (45.70)	6.62*	.43***
Employment type				
Permanent worker	9 (4.02)	256 (28.60)	59.92***	
Unemployed	55 (24.55)	44 (4.92)	85.67***	.10***
Temporary worker	67 (29.91)	528 (58.99)	60.86***	.50
Self-employed	93 (41.52)	67 (7.49)	169.33***	.16***
Housing tenure status				
Renter	98 (43.75)	821 (91.73)		
Homeowner	126 (56.25)	74 (8.27)	281.00***	.19***
Residential area				
Metropolitan area	63 (28.13)	587 (65.59)	103.27***	
Non-metropolitan area	161 (65.59)	308 (34.41)		.26***

*Note.* OR = odds ratio. Reference group is shown below the variable name.

\* *p*<.05. \*\**p*<.01. \*\*\**p*<.001.

## Changes in household economic well-being.

Table 3 shows the changes in outcome (household monthly earned income and income poverty status) between 2010 and 2012 among the Hope participants. In Hope, an increase in earned income leads to a rise in earned income credit and a consequent rise in savings in the Hope account. For the 895 households that stayed in Hope until December 2012, two years after commencing the program, household income increased an average of \$84.69 and income poverty status (income-to-needs ratio) rose an average of 5% among all participants. However, these outcomes varied by household income distribution. Changes in income were largest at the highest income quantile (90<sup>th</sup>): \$100.67, and smallest at the lowest income quantile (10<sup>th</sup>): \$61.96. In contrast, changes in income-to-needs ratio were largest at the lowest income quantile (10<sup>th</sup>): 7%, and smallest at the highest income quantile (90<sup>th</sup>): 2%. At the middle income quantile (10<sup>th</sup>): 7%, and 75<sup>th</sup>), changes in both household income and income-to-needs ratio were larger for the relatively lower income group (25<sup>th</sup>) than for the higher income groups (50<sup>th</sup> and 75<sup>th</sup>).

### Table 3.

Changes in H	Household	Economic	Well-being,	2010 -	2012
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	Monthly earned income <sup>a</sup>	Income-to-needs ratio
	Full sample $(n = 895)$	Full sample $(n = 895)$
	М	(SD)
Total	84.69 (138.51)	.05 (.11)
10 <sup>th</sup>	61.96 (91.22)	.07 (.18)
25 <sup>th</sup>	82.51 (139.29)	.06 (.15)
50 <sup>th</sup>	70.47 (124.25)	.05 (.11)
75 <sup>th</sup>	74.83 (138.68)	.05 (.10)
90 <sup>th</sup>	100.67 (132.68)	.02 (.11)

*Note*. <sup>a</sup>Figures are reported as USD (USD: KRW = 1:1,000)

## **Balance check.**

Table 4 presents the standardized differences in means of each covariate before and after the propensity score when comparing the treatment and comparison groups. One of the most common ways of assessing balance is to estimate the difference in means of each covariate, divided by the standardized deviation. This measure is referred to as the "standardized bias" or "standardized difference in means" (Stuart, 2010). A standardized difference in means greater than 0.2 represents a substantial difference between groups that can lead to a biased result (Stuart, 2010). As described in Table 4, in the original sample (before the propensity score), most standardized differences in means rise to this level. The propensity score was successful in making the groups conditionally exchangeable in terms of the distributions of measured covariates, as indicated by the standardized difference in means closer to zero in a matched sample created by the 1 to 1 nearest neighbor within a caliper of  $0.25\sigma$ . There was a dramatic reduction in sample size: the number of subject in the resample was 184 (92 in the treatment and 92 in the comparison group). When using the PSM, such a sample reduction is not uncommon in social welfare literature (Guo, Barth, & Gibbons, 2006).

## Table 4.

## Standardized Difference in Means of Socioeconomic Characteristics

	Standardized difference in means <sup>a</sup>				
Variable	Original samples (n=1,119 <sup>b</sup> )	Matched samples (n=184 <sup>c</sup> )			
Number of household members	0.81	-0.03			
Number of workers	0.08	-0.08			
Monthly income in 2010	0.75	0.00			
Age	-2.36	0.18			
Gender - Male	-0.55	0.02			
Marital Status					
Married	-0.55	0.07			
Divorced/widowed/separated	0.58	-0.07			
Single	-0.10	0.00			
Education level – High school or higher	0.89	-0.04			
Self-rated physical health					
Poor	-0.04	-0.02			
Fair	-0.18	-0.02			
Good	0.19	0.04			
Employment type					
Permanent worker	0.54	0.04			
Unemployed	-0.91	0.00			
Temporary worker	0.59	0.04			
Self-employed	-1.29	-0.10			
Housing tenure status - Homeowner	-1.74	0.00			
Residential area - Non-metropolitan area	-0.79	0.20			

*Note.* <sup>a</sup> Standardized difference in means between treatment and comparison group. <sup>b</sup> Original samples consist of the treatment group (n=895) and comparison group (n=224). <sup>c</sup> Matched samples consist of the treatment group (n=92) and comparison group (n=92).

Figure 2 shows that after matching, the distribution of propensity scores for the treatment (Hope participants) and comparison (Hope nonparticipants) groups were similar and inference was being restricted to region of common support.



After PS Matching

Figure 2. The distribution of the estimated propensity score for treatment and comparison groups before and after matching.

### Impacts of Hope program on the participant's economic well-being.

Table 5 reports the estimated treatment effect of Hope for the treatment group (Hope participants). I reported the estimated mean and five quantiles (10<sup>th</sup>, 25<sup>th</sup>, median, 75<sup>th</sup> and 90<sup>th</sup> percentile) for treatment effects for the treatment group using the unmatched and propensity score matched sample. In both the unmatched and matched sample, the average change in the household monthly earned income for Hope participants between 2010 and 2012 was statistically significantly lower than that for nonparticipants. The magnitude of effect was around three times larger in the matched sample (\$303.75) than that in the unmatched sample (\$89.94). However, the impacts of Hope varied over quantiles in both the unmatched and matched samples. At the lower quantiles (10<sup>th</sup> and 25<sup>th</sup>), the change in earned income was statistically significantly higher

for the Hope participants than that for the nonparticipants, while at the higher quantiles (75<sup>th</sup> and 90<sup>th</sup>), it was higher for the nonparticipants than that for the Hope participants. For example, in the matched sample, at the 10<sup>th</sup>, the change in earned income was a statistically significantly \$387.47 higher for the Hope participants than that for the nonparticipants. In contrast, at the 75<sup>th</sup>, the change in earned income was a statistically \$608.71 higher for the nonparticipants than that for the participants. At the lower quantile, the magnitude of effect was larger in the unmatched sample than in the matched sample, and at the higher quantile, it was approximately two or three times larger in the matched sample than in the matched sample than in the unmatched sample.

In both the unmatched and matched samples, there were no statistically significant differences of the average changes in the income poverty status (income-to-needs ratio) between the treatment and comparison groups. However, similar to the impact of Hope on earned income, statistically significant treatment effects were found over quantiles of the income poverty distribution. At the lower quantiles (10<sup>th</sup> and 25<sup>th</sup> percentile), the change in income poverty status was statistically significantly higher for the Hope participants than that for the nonparticipants in both the unmatched and matched samples. For example, in the matched sample, at the two lowest quantiles (10<sup>th</sup> and 25<sup>th</sup>), the change in income-to-needs ratio was 61% and 23% higher for the Hope participants than that for the nonparticipants. On the other hand, at the two highest quantiles (75<sup>th</sup> and 90<sup>th</sup> percentile), the change in income-to-needs ratio was statistically significantly higher for the nonparticipants than that for the nonparticipants.

## Table 5.

	Monthly earn	ed income	Income-to-ne	eds ratio	
Unmatched samples <sup><math>a</math></sup> (n=1,119)					
Mean	-89.94*	(40.79)	-0.05	(0.03)	
10 <sup>th</sup> percentile	415.63***	(27.45)	0.59***	(0.01)	
25 <sup>th</sup> percentile	162.27***	(39.04)	0.33***	(0.01)	
50 <sup>th</sup> percentile (median)	81.38*	(36.82)	0.09***	(0.02)	
75 <sup>th</sup> percentile	-229.61**	(71.90)	-0.26***	(0.02)	
90 <sup>th</sup> percentile	-773.23***	(44.82)	-0.86***	(0.00)	
Matched samples <sup>b</sup> $(n = 184)$					
Mean	-303.75*	(135.21)	-0.18	(0.12)	
10 <sup>th</sup> percentile	387.47***	(19.22)	0.61***	(0.06)	
25 <sup>th</sup> percentile	88.86	(165.38)	0.23***	(0.04)	
50 <sup>th</sup> percentile (median)	-62.88	(129.57)	0.01	(0.05)	
75 <sup>th</sup> percentile	-608.71***	(164.61)	-0.35***	(0.12)	
90 <sup>th</sup> percentile	-1200.00***	(208.16)	-1.14***	(0.03)	

Impacts of Hope Program on the Participant's Economic Well-being, 2010-2012

*Note.* Standard errors are in parentheses. <sup>a</sup>Unmatched samples are before PS matching; They consist of the treatment group (n=895) and comparison group (n=224). <sup>b</sup>Matched samples are after PS matching; They consist of the treatment group (n=92) and comparison group (n=92). \* p < .05. \*\*p < .01. \*\*\*p < .001.

### Effects of Hope participant characteristics on program impact.

I ran a separate quantile regression model to estimate the variations in household monthly earned income and income poverty status (income-to-needs ratio) between 2010 and 2012 among the 895 households that fully participated in Hope through December 2012. As shown in Table 6, household size, monthly earned income in 2010 (before the program), head's marital status, self-rated health condition, and residential area were statistically significant predictors of monthly earned income variation before and after the program (2010 and 2012). The effect of each covariate differed over the quantiles. Interestingly, at the lower quantile (25<sup>th</sup>), as the number of household members increased, participants' monthly earned income decreased by \$47.07. In contrast, at the two highest quantiles (75<sup>th</sup> and 90<sup>th</sup>), larger household size was positively associated with participants' earned income: each household member was associated with an increase of \$109.97 to \$209.81 in earned income between 2010 and 2012. Monthly earned income in 2010 was a statistically significant and negative predictor at the two highest quantiles (75<sup>th</sup> and 90<sup>th</sup>). For every \$1 increase in 2010 monthly income, the increase in participants' earned income between 2010 and 2012 was \$0.38 to \$0.80 smaller. Participants who were divorced, widowed, or separated earned \$38.25 to \$45.61 less than married participants at the middle quantiles (25<sup>th</sup> and 50<sup>th</sup>). At the 75<sup>th</sup>, participants who reported their health condition as fair increased earned income \$29.26 less than those who reported their health condition as poor. Residents of nonmetropolitan areas earned \$23.92 less than those living in metropolitan areas.

## Table 6.

Results of Quantile Regression (n=895), Difference in Monthly Earned Income, 2010-2012

Variable	Mean	$10^{\text{th}}$	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>
Number of household members	54.23***	-42.85	-47.07*	4.87	109.97***	209.81***
	(15.20)	(24.07)	(20.50)	(19.32)	(16.46)	(19.18)
Number of workers	5.29	-16.26	8.46	8.56	15.48	7.16
	(8.95)	(13.61)	(11.59)	(10.92)	(9.30)	(10.85)
Monthly income in 2010	-0.23**	0.08	0.15	-0.02	-0.38***	-0.80***
	(0.07)	(0.11)	(0.10)	(0.09)	(0.08)	(0.09)
Age	0.00	0.76	1.59	-0.54	-1.11	-1.02
	(0.79)	(1.26)	(1.07)	(1.01)	(0.86)	(1.00)
Gender - Male	16.80	9.89	6.48	13.10	7.58	10.46
	(12.01)	(19.02)	(16.20)	(15.27)	(13.01)	(15.16)
Marital Status – Married						
Divorced/widowed/separated	-28.03	12.44	-45.61*	-38.25*	-22.65	-17.24
	(14.03)	(22.21)	(18.92)	(17.83)	(15.190	(17.70)
Single	-29.92	-18.73	-55.31	-31.72	-4.51	-14.06
	(23.45)	(37.14)	(31.63)	(29.81)	(25.39)	(29.60)
Education level – Less than high sc	hool					
High school or higher	13.84	0.40	7.34	10.19	5.88	7.49
	(10.56)	(16.73)	(14.25)	(13.43)	(11.44)	(13.33)
Self-rated physical health - Poor						
Fair	-34.22**	0.68	-18.68	-31.30	-29.26*	-12.83
	(12.59)	(19.94)	(16.98)	(16.00)	(13.63)	(15.89)
Good	-15.60	11.68	-3.98	-13.23	-15.65	-2.52
	(11.35)	(17.98)	(15.31)	(14.43)	(12.29)	(14.33)
Employment type - Permanent work	er					
Unemployed	-23.76 (23.25)	16.62 (36.83)	5.09 (31.37) 7.60	-30.52 (29.56)	2.33 (25.18)	-11.82 (29.35)
Temporary worker	-4.80 (10.81) -4.04	(17.12)	(14.59)	(13.74) 7.69	9.97 (11.71) 7.51	(13.65)
Self-employed	(19.21)	(30.42)	(25.91)	(24.42)	(20.80)	(24.25)
Housing tenure status - Renter						
Homeowner	6.41	16.89	9.62	-20.05	-13.74	-7.05
	(16.92)	(26.80)	(22.83)	(21.51)	(18.32)	(21.36)
Residential area - Metropolitan						
Non-metropolitan	-23.92*	-20.72	-21.59	-19.68	-8.47	-5.75
	(9.73)	(15.40)	(13.12)	(12.36)	(10.53)	(12.28)

*Note.* Standard errors are in parentheses. Reference group is shown next to the variable name. p < .05. p < .01. p < .01.

For the changes in income poverty status (income-to-needs ratio) between 2010 and 2012, the number of household members, monthly earned income in 2010, head's marital status, self-rated health condition, and residential area were statistically significant predictors. The effect of each covariate also varied across the quantiles. The number of household members was statistically significant at the two highest quantiles (75<sup>th</sup> and 90<sup>th</sup>). One increase in household member contributed to a 7 to 13% increase in income-to-needs ratio. Monthly earned income was also statistically significant only at the two highest quantiles. As income in 2010 and 2012. Participants were less likely to increase in their income-to-needs ratio between 2010 and 2012. Participants who were divorced, widowed, or separated increased their income-to-needs ratio 3 to 4% less than married ones at the middle quantiles (25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup>). Those living in non-metropolitan areas were 2 to 3% less likely to increase their income-to-needs ratio than residents in metropolitan areas.

## Table 7.

Results of Quantile Regression (n=895), Difference in Income-to-needs Ratio, 2010-2012

Variable	Mean	$10^{\text{th}}$	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>
Number of household members	0.04**	-0.03	-0.03	0.00	0.07***	0.13***
Number of nousehold members	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Number of workers	0.00	-0.01	0.00	0.01	0.01	0.00
Number of workers	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Monthly income in 2010	-0.001***	0.00	0.00	0.00	-0.001***	-0.001***
Monumy medine in 2010	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
A go	0.00	0.00	0.00	0.00	0.00	0.00
Age	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male	0.01	0.02	0.00	0.00	0.01	0.00
Mate	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Marital Status - Married						
	-0.03*	0.01	-0.04***	-0.04*	-0.03*	-0.01
Divorced/widowed/separated	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)
	-0.03	-0.04	-0.06*	-0.04	-0.01	0.00
Single	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)
Education - Less than high school						
	0.01	0.00	0.01	0.01	0.01	-0.01
High school degree or higher	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Self-rated health - Poor						
Foir	-0.03**	0.00	-0.02	-0.02	-0.03*	-0.01
Fall	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Good	-0.01	0.01	-0.01	-0.01	-0.01	0.00
0000	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Employment - Permanent worker						
Unamployed	-0.01	-0.01	0.00	-0.02	0.01	0.00
Unemployed	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)
Temporary worker	0.00	0.01	0.01	0.00	0.01	0.00
remporary worker	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Self-employed	0.00	0.00	0.01	0.01	0.02	0.03
Sen employed	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Housing tenure status - Renter						
Homeowner	0.00	0.00	0.01	-0.01	-0.02	-0.01
Homeowner	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Residential area - Metropolitan						
Non-metropolitan	-0.02**	-0.02	-0.03*	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)

*Note.* Standard errors are in parenthesis. Reference group is shown next to the variable name. p < .05. \*\*p < .01. \*\*\*p < .001

## Discussion

To my knowledge, this is the first paper to examine the impact of Hope program participation on household economic well-being. When reducing the internal validity threats by the PSM and DID model, the statistically significant impacts of Hope program varied over income and income-to-needs ratio distributions. The significant impacts of Hope on a household's income and income-to-needs ratio found in this study are inconsistent with previous research by Mills et al. (2008), which found no discernible impact of IDA programs in the US on income-to-needs ratio. Lower income Hope participants were more likely to increase their monthly earned income and income poverty status (income-to-needs ratio) (e.g., \$387.47 and 61% at 10<sup>th</sup>) compared to demographically similar nonparticipants between 2010 and 2012. In contrast, higher income Hope participants were less likely to increase their income and incometo-needs ratio than nonparticipants. These findings suggest that the Hope program worked more effectively for lower income households than for higher income households. This finding is in line with Huang's (2010), which shows that participants at the bottom quartile of wealth distribution responded to IDA saving incentives better than participants in the higher quartiles. The Hope participants whose earned income was already near the poverty line (MLS) did not statistically significantly lift their household income and income poverty status. This may be explained by the asset accumulation and labor market disincentives embedded in the NBLS policy. As cited by a few empirical studies (e.g., Ku, Lim, & Moon, 2010; Noh, Lee, & Won, 2007), the NBLS policy negatively affects the earned income of recipients and encourages people to stay on welfare. One of main reasons is that recipients were afraid of losing housing, medical, and educational benefits from the NBLS (Noh et al., 2009). Although the Hope program required its participants to leave the NBLS to receive total accumulated assets three years after

beginning the program, participants with incomes near the absolute poverty line (MLS) might maintain their incomes just below the poverty line to maintain their NBLS eligibilities at least during the three years of Hope program participation. Choi et al. (2012) found that around 20% of Hope participants even considered leaving the Hope program because they were reluctant to exit the NBLS.

Findings from this study provide preliminary evidence that among program participants, the impacts of Hope were unequally distributed across economic and socio-demographic groups. For households in the lower and middle quantiles (10<sup>th</sup>, 25<sup>th</sup> and 50<sup>th</sup>), participants with larger households, who were single, or resided in non-metropolitan areas benefited less than others. This is consistent with previous research showing that among low income households, larger household size reduces the probability of exiting poverty because of the economic burdens of more dependent family members such as children, the elderly, and the disabled (Ahn et al., 2011; Noh et al., 2009). Since most care-centered responsibilities in Korea are shouldered by independent household members, especially females, huge financial burdens have worsened households' economic hardships and restricted independent household members from actively participating in the labor market (Lee & Ban, 2009). Furthermore, consistent with previous research (Ahn et al., 2011; Kim & Choi, 2006), divorced, separated, and widowed families were less likely to increase their earned income and income-to-needs ratio than married ones. This finding may be relevant to the current trend of rising poverty rates among single households in Korea. Two-person families participating in Hope are likely to have a number of advantages over single-person households (Song & Yeo, 2010). First, two-person families are able to share caregiving responsibilities for both children and aging parents. Next, two-person families can be more selective in the labor market when choosing jobs and other earnings opportunities.

Accordingly, two-person families are at less risk for economic vulnerability. The relative income poverty rate (measured by 50% of median income) was 52.38% for single-parent households, while it was 6.85% for two-parent households (Song & Yeo, 2010). It is important that social welfare policymakers better understand why the program is not working as effectively for certain groups of participants. Hope participants living in non-metropolitan areas were less likely to increase their earned income or income-to-needs ratio than those in metropolitan areas. This is consistent with previous research by Noh et al. (2009) showing that people living in metropolitan areas were more likely to raise their income above the income poverty line (MLS) because of the better economic environment (such as a larger job market) of metropolitan areas.

For households in the higher quantiles (75<sup>th</sup> and 90<sup>th</sup>), household size and income in 2010 were statistically significant predictors of the program's impact. Earned income rose by \$109.97 to \$209.81 for each additional household member. It suggests that in contrast to lower income households, among higher income households, increased household size may be associated with a high likelihood of having more workers in a household. Households who had higher earned income in 2010 were less likely to increase their earned income and income-to-needs ratio between 2010 and 2012. This may have two possible explanations. First, Hope participants whose income is near the poverty line (MLS) may have difficulty in increasing monthly earned income beyond a certain level because of their precarious employment status. In addition, considering that only persons receiving the NBLS welfare payments are eligible to participate in Hope, it may reflect the NBLS recipients' tendency to avoid increasing their earnings above the poverty line in order not to lose their NBLS eligibility and benefits (Kim et al., 2008; Noh et al., 2007).

At the 75<sup>th</sup> percentile, participants who reported their health conditions as "fair" were less likely to increase their earned income and income-to-needs ratio than those who reported "poor" conditions. This finding is inconsistent with previous research that found household heads with better health had a higher likelihood of exiting poverty (Ahn et al., 2011; Noh et al., 2009). These contrasting findings may be due to discrepancies between subjective and objective assessments of health status (Wu et al., 2013). For example, some studies have reported that old people and women considered themselves healthier than as assessed by objective health indicators such as physical symptoms and everyday functional capacities (Mitrushina & Satz, 1991).

After commencing the program in 2010, around 34% of participants left the program by the end of 2012. There were statistically significant differences in marital status (single), employment status (self-employed), and housing tenure status between stayers and leavers. Findings from a within group regression indicated that these covariates were not statistically significantly associated with outcomes (income and income-to-needs ratio). Thus, significant differences in these covariates between two groups (stayers and leavers) may not influence the outcomes (not lead to an attrition bias).

### Limitations

Although PSM and DID estimation offers a strong evidentiary base to correct for internal validity, the average treatment effect in this study is not causal and has several limitations. First, results may still be prone to omission of important heterogeneity affecting treatment assignment (i.e., selection due to unobservable factors). For example, previous research has shown that psychological characteristics such as confidence, self-control, neighborhood environment, and responsibilities of care for a parent or child influence welfare dependency and earnings of low

income households (Ahn et al., 2011; Ellwood, 1989; Noh et al., 2009). In addition, due to data availability, time-varying variables cannot be considered in the present study. There might be changes in variables between 2010 and 2012 such as number of workers, marital status, employment type, or housing tenure status that may be associated with the outcomes under study. However, the present study used the covariates collected at the baseline of 2010 to predict the propensity score because Hope panel data is only available between 2010 and 2011. Lastly, considering that the ultimate goal of asset-based policies is to provide persistent economic benefits such as assets, income, employment, and savings behaviors that last well beyond the end of the interventions, two years may be too short a period of time to estimate the program's long-term impact (Grinstein-Weiss et al., 2013). Thus, it is important to recognize that this study is preliminary and additional research is needed to estimate the causal impact of the Hope program after the end of the program.

#### **Research Implications**

The present study provides a number of implications for future social welfare research. The Hope program is a matched-savings program that could affect more than simply current economic status; it could fundamentally alter a household's future prospects by helping them acquire education, buy a home, or start a business (Mills et al., 2008). Accordingly, to gain a fuller understanding of Hope's impact, future research is needed to study other potential treatment impacts of Hope such as financial assets, home ownership, education, and behavioral changes after program completion. Furthermore, long-term analysis is important to estimate the impact of asset-based interventions.

Lastly, future studies are needed to understand changes in the Hope program implementation. The Korean government reduced the earned income grant rate from 1.05 to 0.85 in 2013 due to budget limitations, and in 2014 stopped providing additional matched funds for participants' savings. Thus, the total subsidy for participants commencing the program in 2014 and beyond will decrease. Future research is needed to estimate and compare the impact of Hope on participants between those who commenced the program before and after institutional changes. This research would help us understand how the Hope program's impact has been affected by its institutional characteristics.

### **Policy Implications**

The main goals of the Hope program are to encourage the working poor to exit poverty by increasing earnings and savings (Choi et al., 2012; Han & Kim, 2014). The present study found that lower income households have benefited more from Hope than relatively higher income households. Based on this finding, I suggest lowering the minimum income eligibility of the Hope program (to below 60% of the MLS) to allow for more low income households to join the program. By mitigating barriers to income eligibility, more low income households would be able to benefit from Hope by increasing their income and improving income poverty status through the program.

Next, as mentioned previously, disincentives embedded in the NBLS policy may discourage Hope participants from increasing their incomes and accumulating more assets. Incentives provided in Hope may provide an attractive opportunity to increase income for lower income households. On the other hand, households whose income is near the poverty line (MLS) cannot increase their earned income above the poverty line without losing NBLS eligibility and its educational, housing, and medical benefits. Choi et al. (2012) showed that most Hope participants reported that they would need education, medical, and housing benefits after leaving the NBLS system. Noh et al. (2009) also indicated that people who exited the NBLS program
suffered from education, medical, and housing expenses. Although Hope participants can receive the education and medical benefits for three years after exiting the NBLS, findings from the present study suggest that this is still insufficient to induce the participants to increase their earnings above a certain level. Thus, it is necessary to expand the coverage of medical and educational benefits for low income households. As suggested by Shapiro (2001) and Sherraden (2003), asset-based policy should take into account the current structure of social security and labor market dynamics.

Lastly, one of the most important policy strategies to accomplish the program's goals is raising the program graduation rate (Choi et al., 2012). According to the KMOHW (2013), only around 60% of the participants commencing the program in 2010 successfully completed the program and made matched withdrawals. Previous research suggests that it is important to modify relevant institutional structures to promote full participation (Rohe et al., 2005; Rothwell & Han, 2010; Schreiner, Clancy, & Sherraden, 2002). In particular, Rohe et al. (2005) found that good case management and effective economic literacy training played the most important role in participants' ability to complete an IDA program successfully. Considering this, I propose that graduation rates could be increased by providing targeted and "just-in-time" case management services. When the program started in 2010, 141 local self-sufficiency centers in Korea hired case managers for the Hope program participants, but the number has decreased since then due to budgetary constraints. Therefore, the government should invest more to enhance case management for the program's participants.

## **Chapter 5**

This dissertation combined three studies to advance existing knowledge of the conditions of asset poverty in Korea and test the impact of an asset-based intervention. This dissertation incorporated three theories that give rationale for asset-based intervention as a new anti-poverty strategy: consumption theory, social stratification theory, and social development theory. Nine main research questions were set.

- 1. Research questions for study 1 (Chapter 2)
  - a. How does the probability to incur asset poverty vary by different theoretical and conceptual framework for the last decade, 2005 to 2014?
  - b. Is the probability to incur asset poverty persistent over time?
  - c. Who are most likely to experience asset poverty at different points in time between 2005 and 2014?
- 2. Research questions for study 2 (Chapter 3)
  - a. To what extent is asset and income poverty associated with material hardship?
  - b. How does the association vary according to the form of material hardship considered (food, utility, housing, and health)?
  - c. Who is at risk for material hardship?
- 3. Research questions for study 3 (Chapter 4)
  - a. To what extent does the Hope program impact participants' monthly income?
  - b. To what extent does the Hope program impact participants' income poverty status?
  - c. Which Hope participants benefit the most?
  - d. To what extent does the sample attrition influence the impact of the Hope program?

## **Summary of Key Findings Across Studies**

The three studies of the previous chapters show that asset poverty in Korea was structurally persistent for the decade studied (2005 to 2014), that the asset poor were more vulnerable to material hardship than the income poor, and that Korea's current asset-building program (Hope) was not entirely effective in improving the economic status of the asset poor. Presuming that the goal of anti-poverty policy is to increase household welfare status including income, consumption, assets, and more broadly functions and capabilities, these findings reveal a need for wider use of asset-based poverty measures and more effective asset-building interventions to address the condition of asset poverty in Korea. In the following paragraphs, I discuss in detail the findings of each study of this dissertation.

The first study of my dissertation examined the persistence of asset poverty in Korea over time (2005 to 2014). Some scholars have argued that the asset poverty measure can reflect the dynamics of "true" life conditions of households and the possibility of their upward mobility (Baulch & Hoddinott, 2000; Haveman & Wolff, 2005). This advantage of the asset poverty measure over income measures is that assets can have functions beyond the provision of immediate consumption needs. For instance, assets can function as a storehouse for future consumption or a resource for life opportunities. To consider the various functions of assets, in the first study of this dissertation, I defined assets within the consumption and development theoretical frameworks. A list is presented to show key findings from the first study.

- a. Asset poverty was most prevalent when defining assets as financial assets.
- b. The risk of asset poverty was persistent over time when defining assets by either of the theoretical frameworks.

- c. In particular, the risk of asset poverty was the most persistent when focusing on the role assets play in enabling opportunities for socioeconomic mobility such as education, home ownership, and business. Accordingly, lack of assets restricts opportunities for mobility and may lead households to fall into structural and persistent poverty. This finding on asset poverty is inconsistent with previous studies on the dynamics of income poverty (e.g., Bane & Ellwood, 1986; Ku, 2005) although they employed different methods from the present study by including poverty spells. While the present study suggests that the asset poor were structurally trapped in poverty over time, Bane and Ellwood (1986) and Ku (2005) found that most of the income poor experienced poverty only for a short period and then managed to raise their incomes above the poverty line.
- d. Home ownership, greater ratio of productive assets, higher disposable income, and head's single marital status, low education level, and precarious employment status statistically significantly decreased the chance to incur asset poverty for most analysis samples.

Because assets play a role in sustaining a basic consumption level during temporary hardship, the asset poverty measure is useful to capture the real dimensions of hardship and deprivation of different groups of people and households. To further illuminate the relationships between asset poverty and material hardship, the second study of this dissertation examined the extent to which asset poverty was associated with material hardship in Korea. A list is presented to show key findings from the second study.

e. The asset poor suffered more from a lack of basic necessities including food, housing, utility, and health than their incomes would suggest. The asset poor only, despite having

incomes above the poverty line, were more vulnerable to material hardship when compared to those who were income poor only.

- f. Households who experienced poverty only in assets not only lack capital assets, but were ineligible for welfare benefits because their household income was above the poverty line (MLS in Korea). In addition, due to their precarious employment status (around 80% were unemployed, temporary workers, and self-employed), the asset poor only may be excluded from fringe benefits such as severance pay, bonuses, overtime pay, and paid holidays offered by their employers.
- g. Household's economic and socio-demographic characteristics such as household size, head's marital status and employment type, and home ownership were statistically significant predictors of household's hardship experience.

In sum, the first two studies of this dissertation found that the asset poor in Korea were structurally and persistently poor, and more vulnerable to material hardship than estimated by the income poverty measure. To mitigate asset poverty over the long term, many stakeholders and researchers have paid particular attention to asset-building programs as independent from income transfer programs (Midgley, 2005; Sherraden, 1991).

To explore whether one of Korea's existing asset-building programs, the Hope Growing Account program (Hope), effectively works to address the poverty condition in Korea, the third study of this dissertation estimated the impact of the Hope program on participants' economic well-being as measured by household income and income poverty status. A list is presented to show key findings from the third study.

h. Incentives provided in Hope helped some but not all participants increase earnings and improve their income poverty status. The impact of Hope varied across the income

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distribution of the sample group. For lower income households, Hope participants' household income and income poverty status increased more than that of nonparticipants. In contrast, for higher income households, Hope participants' income and income poverty status was less likely to increase than that of nonparticipants. Considering that only persons receiving National Basic Livelihood Security (NBLS) benefits are eligible to join Hope, participants whose income is near the poverty line may be reluctant to increase their income above a certain level since they are afraid of losing NBLS benefits including cash, medical, housing, and educational benefits.

i. Among Hope program participants, the impact of Hope varied according to household size, monthly earned income in 2010, head's marital status, self-rated health condition, and residential area.

#### **Strengths, Limitations, and Future Directions**

One of the strengths of this dissertation is that it measured assets within different theoretical frameworks. The roles of assets vary depending on how assets are conceived and which theoretical framework is used, and this may lead to different understandings of the condition of asset poverty and policy implications. Although asset-building programs are based on the idea that assets can be a resource for life opportunities beyond the satisfaction of consumption needs, most previous research on asset poverty has defined assets as a resource for future consumption. To my knowledge, this is one of the first empirical studies to estimate asset poverty in Korea within social development theory. I found that the risk of asset poverty was the most persistent over time in the sample that defined assets as a resource for socioeconomic development and upward mobility. Persistent asset poverty may signal structural and perpetual poverty status. In addition to the three main theories widely used in the social welfare research on asset poverty (consumption, social stratification, and social development), I referred to literature from other relevant disciplines. For example, the first study of this dissertation was informed by literature in development economics that provides insight into the dynamics of asset poverty. Empirical research on the dynamics of asset poverty in development economics has focused on the association between initial household wealth and future risk of asset poverty. Empirical evidence suggests that initially poorer households (or individuals) tend to remain trapped in poverty over time (Zimmerman & Carter, 2003). Behavioral economics may provide implications for the continued study of asset-based interventions. According to behavioral economics, if people are more aware of how and why to save, they may attempt to control their spending and save more. Thus, scholars in behavioral economics argue that savings programs engender new savings and financial habits in the poor, and that these habits lead to improvements in household income, expenditure, and assets that persist even after the programs end (Bertrand, Mullainathan, & Shafir, 2004; Karlan, Ratan, & Zinman, 2014).

In ways that other studies in Korea have not, I incorporated various methodologies to reduce threats to internal validity. Internal validity refers to whether one can draw inferences from a valid demonstrated causal-effect relationship (Campbell, 1957; Meyer, 1995). Internal validity can be threatened by omitted variables, mismeasurement, political economy, selection, and attrition (Meyer, 1995). In my dissertation, some threats to internal validity needed to be addressed such as attrition and selection bias. First, when using a panel dataset like the Korean Welfare Panel Study (KOWEPS), there is a risk that the results will be contaminated by attrition bias (Contoyannis, Jones, & Rice, 2004). In the current dissertation, there was attrition at each wave and missing values in focal variables (net worth) in the data from the KOWEPS. To

address this issue, in the first study of this dissertation, I employed the dynamic panel model of discrete choice, taking account of unobserved heterogeneity and true state dependence (Allison, 1982; Heckman, 1981). In addition, selection bias is unavoidable in empirical research on the asset-building program because participants are both program-selected through eligibility criteria and self-selected through voluntary participation in the program (Fry, Mihajilo, Russell, & Brooks, 2008; Grinstein-Weiss, Charles, & Curley, 2007; Grinstein-Weiss, Yeo, Despard, Casalotti, & Zhan, 2010). The third study of my dissertation attempted to control for selection bias by using propensity score matching (PSM) and difference-in-differences (DID). As a result, in the sample created by PSM, imbalance in the observed covariates between two groups were successfully removed.

Despite these theoretical and methodological efforts, readers are encouraged to interpret findings about the conditions of asset poverty and the impacts of asset-based intervention in Korea with caution for a few reasons. First, when studying the dynamics of asset poverty (study 1), I did not include the duration of asset poverty in the model because of a large amount of left and right censoring in the data. Future research needs to account for households' multiple asset poverty spells by using an alternative data resource such as the Survey of Household Financial and Living Conditions established in 2011 by Statistics Korea.

Next, to examine the actual living condition of the poor, this dissertation used material hardship indicators (study 2). Since there is no universal consensus on the definition of basic needs, most empirical research in the US and Korea has measured basic needs by food, housing, utility, medical care, and consumer durables. However, this hardship measure is limited and does not examine the extent that the poor experienced disadvantages in their lives relative to the community, society, or nation to which they belong (Townsend, 1987). Future research is needed

to develop hardship measures that cover multi-dimensional aspects of living conditions in Korean society including dwelling environment and facilities issues such as noise, pollution, crime, and overcrowding, and social deprivation.

Finally, while most asset-building research has studied savings amounts (measured by an average monthly net deposit), savings regularity (measured by deposit frequency), and asset accumulation as dependent variables, this dissertation used participants' economic well-being (income and income poverty status) as its dependent variables (study 3). Considering that one of the intended long-term impacts of Hope is to encourage asset accumulation among the poor, future research is needed to estimate the treatment effects on participants' home ownership, business ownership, and financial assets after completion of the program.

#### **Implication for Policy and Practice**

Sherraden (1991), who first introduced IDAs to the US, stated, "While income feeds people's stomachs, assets change their heads" (p. 6). Asset-based policy is not a panacea, but it can greatly complement income-based policies to assist vulnerable populations to achieve future life goals by accumulating assets (Sherraden, 1991). Korea is striving to establish a productive and sustainable welfare state (Korean Government, 2014), and asset-based policy is expected to supplement existing welfare structures for the asset poor, who are marginalized from current social policy.

To be effective, asset-based policy should be implemented through various creative assetbased welfare efforts resulting in a major new form of social policy (Sherraden, 1991). Several issues should be considered when formulating a progressive asset-based policy to complement the existing social security system in Korea. First, a more progressive policy is needed to encourage home ownership in Korea. This dissertation found that home ownership considerably decreased the probability of incurring asset poverty and material hardship (key finding d and g). Despite its importance, only 10.8% of those at the bottom quintile of asset distribution were homeowners in Korea (Statistics Korea, 2015). In addition, more Koreans are struggling to make rent. According to Jin (2013), among renters, 31.9% spent 30% or more of their total income to cover the rent in 2012 (25.5% in 2010). Renters with middle-class incomes are having a particularly hard time making ends meet. Among renters who dedicated 30% or more of their income toward housing, 32.5% were low income households and 46.7% had middle-class incomes. A high financial burden of housing does not only mean less spending on basic consumption such as food and clothing, it also makes it tougher to invest in long-term goals such as precautionary savings, education, or retirement. The Central Provident Fund (CPF) in Singapore provides a good example that might be applicable to home ownership expansion efforts in Korea. Through the CPF, the Singapore government provides low-cost public housing and an opportunity to accumulate capital to buy a home (Lee, 2014). Although the Korean government has increased investment in low-cost public housing (creating 125,000 new housing units in 2016), low income and low wealth households still lack opportunities to accumulate assets for a down payment (Jin, 2013; Korean Ministry of Land, Infrastructure, and Transport [KMOLIT], 2017). Korea can learn from the CPF in Singapore that to increase the home ownership rate, it is important not only to provide public housing, but also to enhance the affordability of publicly subsidized housing. Evidence shows that the CPF has led to a substantial rise in home ownership, even for those with low-incomes, which has in turn enhanced social stability in Singapore (Sherraden, 2003). In addition, the CPF has positive psychological impacts including benefits to confidence, security, control, and independence because it makes people feel that social policy decisions are determined by themselves (Sherraden, Nair, Vasoo,

Liang, & Sherraden, 1995). However, it should be noted that the success of the CPF in Singapore depends on the Singaporean government's strict regulation of the housing regime. Before introducing a CPF-like housing policy in Korea to address market failure and achieve a high home ownership rate, policymakers would need to consider the extent to which the Korean government is able to intervene in the nation's housing market. The CPF in Singapore is a universal and mandatory savings scheme funded by contributions from employers and employees. Besides housing, most social provisions including old age care, transportation, health care, and education are financed out of the CPF's individual asset accounts. In contrast, in Korea, the social insurance scheme including national pension and health insurance plays a significant role in the welfare system. In light of this, to introduce a universal and mandatory matched savings program like the CPF for housing in Korea would require a national discussion to determine its coverage and adequacy.

Second, particular attention should be paid to combining savings programs with the current social security system including social insurance and the NBLS. High financial asset poverty in Korea (key finding a) indicates that the asset poor may experience hardship during economic hard times such as unemployment or retirement. To support the asset poor, asset-based intervention needs to be expanded to complement the existing social security system. For example, in Chile, under the Unemployment Insurance Savings Accounts (UISAs) system, each worker is required to save a fraction of earnings in his or her account, and this savings is matched by the employer or government (Sehnbruch, 2006). The unemployed can withdraw funds from the individual account if he or she contributed for 12 months prior to becoming unemployed (Hartley, van Ours, & Vodopivec, 2011). Although the UISA is criticized for its low coverage, an empirical study suggests that the UISA is likely to minimize the moral hazard

normally associated with traditional unemployment insurance (Hartley et al., 2011; Sehnbruch, 2006). Asset-based intervention could not totally replace the current welfare policies in Korea like it has in Chile or Singapore because of the important role of Korea's social insurance scheme. However, a matched savings scheme could prove a good way for informal and temporary workers, who are excluded from current social protections, to overcome economic hardship. This method could be effective and could garner more political support than a plan to expand the subsidies of the current system, and it would also minimize the moral hazard (Hartley et al., 2011; Orszag & Greenstein, 2005).

Next, work insecurity among household heads was associated with a high probability of household asset poverty and material hardship experience (key finding d and g). Moreover, findings from this dissertation suggest that asset poverty is more prevalent among the working age group. In consideration of this, a matched savings program should consider enrolling its participants in Active Labor Market Policies (ALMPs) such as job creation, employment incentives, and job training services (Choi, 2014; Shapiro, 2001). If participants in matched savings programs can get higher paying jobs by enrolling in ALMPs, they will be more able to save regularly and accumulate more assets (Choi, 2014; Suk, 2012). Moreover, savings programs for the poor can change their attitudes and prospects toward the future, and improve participation in other programs such as job search and training programs (Bertrand et al., 2004). For example, in Korea, the ALMP program for NBLS recipients named the Hope Ribbon Project gave priority to its participants to enroll in the Hope program. With this policy effort, in 2011, among participants of Hope Ribbon Project, around 45% had decent jobs and 14.8% exited the NBLS. This is much higher than the other ALMP program, which resulted in a 22% employment rate and 10% NBLS exit rate (KMOHW, 2012).

Finally, policy makers should consider adopting asset-based poverty measures to determine welfare program eligibility. Findings from this dissertation suggest that income poverty measurement alone is insufficient to capture the capacity for upward mobility and the actual living conditions of the poor (key finding c and e). Combined with the income measure, the asset poverty measure provides a more comprehensive picture of the conditions of the poor and makes welfare policy more inclusive by targeting a greater number of households suffering from economic hardship (Oliver & Shapiro, 1990; Wolff, 1990). In contrast to the current assetbuilding programs, which primarily use income measures in their eligibility rules, I suggest that asset-building programs should determine eligibility using asset-poverty measures. This will provide structured and subsidized asset-building opportunities for households who remain in asset poverty despite earnings that happen to exceed the poverty level. Furthermore, asset poverty measures can be incorporated into the existing eligibility rules of income-transfer programs. For example, some income-transfer programs such as the NBLS in Korea or Temporary Assistance to Needy Families (TANF) in the US set an asset limit in their eligibility rules. However, the restrictive asset limit has been criticized for being too low and preventing low income households from accumulating assets (Nam & Kwon, 2008; Nam, 2008). The asset poverty measures used in this dissertation can act as a reference for loosening the asset limit for the income-transfer programs.

#### Conclusion

Combined, the three studies in this dissertation are the first attempt at examining the dynamics of asset poverty, living conditions of the asset poor as measured by material hardship, and impacts of an asset-building program (the Hope program) on participants' economic wellbeing in Korea. The rapid growth in asset-based social policies in many Asian countries including Singapore, Taiwan, and Korea has prompted scholars, practitioners, and policymakers to share lessons from current research and policy efforts (Sherraden, Zou, Ku, Deng, & Wang, 2014). This dissertation adds an East Asian perspective to knowledge on asset-based policy, and contributes to efforts to create and implement various new and more effective welfare policies.

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# Appendix A

# Table A1.

|--|

Articles	Asset poverty definition	Analytical methods	Main findings			
Research on asset inequality						
Lee & Lee (2001)	Net worth and real estate inequality	Cross sectional & secondary data (Daewoo longitudinal panel data)	Asset distribution became deteriorated from 1993 to 1998 and worse than income distribution			
Nam (2015)	Net worth and liquid asset inequality	Cross sectional & secondary data (Survey of Household Finance)	Gini coefficient of net worth was 0.60 (that of income 0.43) Share of net worth for top 1% was 12.4%			
Kim (2015)	Net worth and financial asset inequality	Cross sectional & secondary data (Inheritance tax data)	The wealthiest 1% held 26.0% of total assets in Korea in 2010-13 Financial assets more unequally distributed than real estate or housing in 2000 to 2013			
	Re	search on asset poverty				
Lee et al. (2005)	Net worth poverty by 50% of median assets	Cross sectional & secondary data (Survey of Household Consumption)	<ul><li>8.4% were joint asset/income poor,</li><li>24.1% were asset poor</li></ul>			
Kim & Kim (2013)	Net worth and liquid asset poverty by 120% & 150% of the MLS	Cross sectional & secondary data (KOWEPS)	Net worth poverty was 12.7-13.2 & Financial asset poverty 32.8-36.5% Asset poverty is prevalent among female, relatively young, less- educated, and atypical workers.			
Suk (2012)	Net worth, liquid & financial asset poverty by 50% of median assets & the MLS	Cross sectional & secondary data (KOWEPS)	Relative asset poverty rate tended to increase, but absolute asset poverty decreased from 2005 to 2009			
Lee, Yi & Jung (2011)	Net worth poverty by the MLS	Cross sectional & secondary data (KLIPS)	Asset poverty rate rose from 9.8% to 11.1% while income poverty rate decreased by 17.3% from 1999 to 2008			
Kang & Yoo (2009)	Net worth poverty by 50% of median asset (1999 to 2005)	Longitudinal & secondary data (KLIPS)	36% remained in asset poverty for at least 6 years Highly educated, high income households, and the permanent worker showed high likelihood of exit asset poverty			

# Appendices B

# Table B1.

Coefficient on	<b>Probability</b>	of Asset	Poverty i	n RE Model
55	<i>.</i>	5	~	

Variable	Consumption1 (net worth) (n=9,532)	Consumption2 (financial) (n=33,204)	Development (n=13,773)
Lag poverty	0.76 (0.06)	0.84 (0.03)	1.53 (0.06)
Home ownership	-1.73 (0.10)	-0.57 (0.04)	-2.80 (0.11)
Productive assets	-0.03 (0.00)	0.00 (0.00)	0.01 (0.00)
Ln(Income)	-0.76 (0.07)	-1.16 (0.03)	-1.07 (0.07)
Non-metropolitan	0.38 (0.08)	-0.01 (0.04)	-0.47 (0.09)
Household size	0.02 (0.04)	0.03 (0.02)	-0.30 (0.05)
Number of workers	-0.01 (0.06)	-0.26 (0.03)	-0.15 (0.06)
Post-crisis	-0.52 (0.06)	-0.07 (0.03)	-0.42 (0.06)
Age of under 40	-0.53 (0.16)	-0.06 (0.02)	-0.03 (0.02)
Age over 60	-0.17 (0.10)	-0.01 (0.01)	-0.02 (0.01)
Male	0.18 (0.10)	-0.06 (0.06)	-0.26 (0.11)
Divorced/widowed/separated	0.15 (0.11)	0.23 (0.06)	0.40 (0.12)
Single	0.22 (0.18)	0.15 (0.10)	0.33 (0.17)
High school	0.17 (0.10)	-0.04 (0.05)	-0.31 (0.11)
College or higher	0.00 (0.13)	-0.20 (0.06)	-0.51 (0.14)
Unemployed	0.14 (0.13)	0.06 (0.06)	0.15 (0.13)
Temporary worker	0.17 (0.10)	0.34 (0.06)	0.24 (0.11)
Self-employed	-0.14 (0.13)	0.16 (0.06)	0.25 (0.12)

Note. Standard errors are reported in parentheses.

#### Table B2.

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/separat	ed -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)

Coefficient on Probability of Asset Poverty in Wooldridge Probit Model

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

# Appendices C

#### Table C1.

Variable	β	(SE)	95% CI	
Age	0.00	(0.01)	-0.01	0.01
Number of household members	0.30***	(0.09)	0.13	0.47
Number of workers	-0.46**	(0.15)	-0.74	-0.17
Male	-0.19	(0.20)	-0.57	0.20
Marital status – Married				
Divorced/widowed/separated	0.60**	(0.21)	0.19	1.01
Single	0.43	(0.33)	-0.21	1.08
Education level – Less than high school				
High school graduation	-0.22	(0.18)	-0.58	0.14
Some college or higher	-0.48	(0.24)	-0.94	-0.01
Employment type – Permanent worker				
Unemployed	0.46	(0.32)	-0.16	1.07
Temporary worker	0.87**	(0.28)	0.31	1.42
Self-employed	0.73*	(0.31)	0.13	1.33
Housing tenure status – Renter				
Homeowner	-1.16***	(0.16)	-1.48	-0.84
Residential area – Metropolitan area				
Non-metropolitan area	-0.09	(0.14)	-0.37	0.18
Poverty condition – Non-poor				
Joint poor	2.56***	(0.26)	2.04	3.07
Asset poor only	2.25***	(0.27)	1.71	2.78
Income poor only	1.59***	(0.21)	1.18	1.99

Coefficient on the Association between Asset Poverty and Total Hardship

*Note.* Standard errors are in parenthesis. CI = Confident Interval. Reference group is shown is next to the variable name.

#### Table C2.

## Coefficient on the Association between Asset Poverty and Food Hardship

Variable	β	(SE)	95% C	ĽI
Age	0.01	(0.01)	0.00	0.03
Number of family members	0.29**	(0.10)	0.09	0.48
Number of workers	-0.74***	(0.18	-1.09	-0.40
Male	-0.22	(0.22)	-0.65	0.21
Marital status – Married				
Divorced/widowed/separated	0.65**	(0.24)	0.18	1.12
Single	0.32	(0.36)	-0.39	1.03
Education level – Less than high school				
High school graduation	-0.30	(0.20)	-0.70	0.09
Some college or higher	-0.58	(0.29)	-1.15	-0.02
Employment type – Permanent worker				
Unemployed	-0.23	(0.37)	-0.96	0.50
Temporary worker	0.35	(0.33)	-0.31	1.00
Self-employed	0.15	(0.36)	-0.55	0.85
Housing tenure status – Renter				
Homeowner	-1.30***	(0.17)	-1.63	-0.96
Residential area – Metropolitan area				
Non-metropolitan area	-0.11	(0.15)	-0.40	0.18
Poverty condition – Non-poor				
Joint poor	2.56***	(0.30)	1.98	3.15
Asset poor only	1.44***	(0.36)	0.74	2.15
Income poor only	1.53***	(0.23)	1.07	1.99

*Note.* Standard errors are in parenthesis. CI = Confident Interval. Reference group is shown is next to the variable name.

#### Table C3.

## Coefficient on the Association between Asset Poverty and Housing Hardship

Variable	β	(SE)	95% CI	
Age	0.01	(0.01)	-0.02	0.03
Number of family members	0.05	(0.17)	-0.28	0.39
Number of workers	-0.49	(0.29)	-1.06	0.09
Male	-0.01	(0.27)	-0.54	0.52
Marital status – Married				
Divorced/widowed/separated	0.77*	(0.33)	0.11	1.42
Single	0.35	(0.61)	-0.84	1.54
Education level – Less than high school				
High school graduation	-0.34	(0.35)	-1.03	0.34
Some college or higher	-0.02	(0.44)	-0.88	0.85
Employment type – Permanent worker				
Unemployed	-0.73	(0.57)	-1.84	0.39
Temporary worker	-0.28	(0.48)	-1.22	0.66
Self-employed	-0.40	(0.70)	-1.77	0.97
Housing tenure status – Renter				
Homeowner	-1.62***	(0.34)	-2.29	-0.94
Residential area – Metropolitan area				
Non-metropolitan area	-0.35	(0.26)	-0.85	0.16
Poverty condition – Non-poor				
Joint poor	2.91***	(0.60)	1.74	4.08
Asset poor only	3.24***	(0.55)	2.17	4.31
Income poor only	2.13***	(0.56)	1.03	3.23

*Note*. Standard errors are in parenthesis. CI = Confident Interval. Reference group is shown is next to the variable name.

#### Table C4.

## Coefficient on the Association between Asset Poverty and Utility Hardship

Variable	β	(SE)	95% CI	
Age	-0.04**	(0.01)	-0.06	-0.01
Number of family members	0.24*	(0.12)	0.00	0.47
Number of workers	-0.11	(0.20)	-0.50	0.28
Male	0.04	(0.32)	-0.58	0.66
Marital status – Married				
Divorced/widowed/separated	0.49	(0.35)	-0.19	1.18
Single	0.08	(0.49)	-0.88	1.03
Education level – Less than high school				
High school graduation	0.01	(0.30)	-0.58	0.60
Some college or higher	-0.28	(0.39)	-1.04	0.47
Employment type – Permanent worker				
Unemployed	1.25*	(0.49)	0.28	2.22
Temporary worker	1.42**	(0.42)	0.60	2.25
Self-employed	1.21**	(0.44)	0.36	2.07
Housing tenure status – Renter				
Homeowner	-0.45	(0.30)	-1.05	0.14
Residential area – Metropolitan area				
Non-metropolitan area	-0.39	(0.23)	-0.83	0.05
Poverty condition – Non-poor				
Joint poor	2.82***	(0.46)	1.92	3.72
Asset poor only	3.08***	(0.39)	2.33	3.84
Income poor only	1.72***	(0.38)	0.97	2.47

*Note*. Standard errors are in parenthesis. CI = Confident Interval. Reference group is shown is next to the variable name.

#### Table C5.

#### Coefficient on the Association between Asset Poverty and Health Hardship

Variable	β	(SE)	95% CI	
Age	-0.04*	(0.02)	-0.07	-0.01
Number of family members	-0.02	(0.20)	-0.41	0.36
Number of workers	-0.17	(0.31)	-0.78	0.45
Male	-0.19	(0.27)	-0.72	0.34
Marital status – Married				
Divorced/widowed/separated	0.40	(0.38)	-0.34	1.13
Single	0.50	(0.59)	-0.66	1.66
Education level – Less than high school				
High school graduation	-0.11	(0.33)	-0.75	0.53
Some college or higher	-0.76	(0.53)	-1.80	0.27
Employment type – Temporary worker				
Unemployed	1.49	(0.86)	-0.20	3.18
Temporary worker	1.75	(0.83)	0.13	3.38
Self-employed	1.49	(0.87)	-0.21	3.19
Housing tenure status – Renter				
Homeowner	-0.59	(0.39)	-1.35	0.16
Residential area – Metropolitan area				
Non-metropolitan area	-0.15	(0.28)	-0.69	0.39
Poverty condition – Non-poor				
Joint poor	2.52***	(0.55)	1.43	3.60
Asset poor only	2.47***	(0.50)	1.50	3.45
Income poor only	2.10***	(0.46)	1.20	3.00

*Note*. Standard errors are in parenthesis. CI = Confident Interval. Reference group is shown is next to the variable name.