

**The Poor or The Vulnerable?  
Tracking the Targets of Private and Public Transfers Before and  
During the Financial Crisis in Korea\***

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**Abstract**

Using Korean balanced household panel data during 1995-1998, this paper investigates the inter-relationship between private and public transfers. One of the key findings is that the estimation results by a seemingly unrelated bivariate probit model show that private and public transfers are shown to be jointly determined before the crisis but not during the crisis. On the other hand, univariate probit estimation results show a crowding-in effect of public transfers before the crisis whereas a strong crowding-out effect is found when the endogeneity of public transfers is considered. The results also suggest that private transfers were altruistically motivated before the crisis, although the transfer network seems to have been collapsed by the financial crisis. Furthermore, it is shown that private and public transfers might have been well targeted only to the poor but not to the vulnerable. Thus, the Korean government should reconsider its targeting scheme in order to prevent crowding-out effects of its social safety net programs and also to include the vulnerable as targets.

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## 1. Introduction

The Asian financial crisis was truly a watershed in Korea's economic history. With the onset of the crisis, the country's real GDP and real wage contracted by 5.8 and 10 percent, respectively, between 1997 and 1998. Unemployment rate jumped from 2.6 percent to 6.8 percent and inflation rose to 7.5 percent (Bank of Korea 2001; National Statistical Office 2001). As a result of the economic downturn, poverty increased substantially in the country—the 7.5 percent share of poor urban households in the first quarter of 1997 jumped to 23 percent by the third quarter of 1998 (World Bank 2000). Also, the Gini coefficient in terms of per capita income of urban households increased from 0.27 in 1997 to 0.30 in 1998 (Kakwani 2000).

In the face of crisis-induced shocks, Korean households and government were forced to take drastic measures to protect their living standards. The World Bank (2000) reports that the distributional impact of the crisis was smaller than was originally expected and Korean households and government were able to weather the crisis through effective coping policies such as dissavings, sales of assets, and private transfers. Particularly, Goh, Kang and Sawada (2002) find that households reduced expenditure on nonessential luxury items to protect the minimum standard of living and public transfers played a significant role in protecting households in the face of crisis. They, as well as the World Bank (2000), indicate that the government policies play a significant role in recovering the financial crisis.

Assuming public transfers as an independent variable, traditional studies on coping devices, for example Cox and Jimenez (1990, 1995) and Cox, Eser and Jimenez (1998), focus on the determinants of private transfers. In this paper, however, the joint decision process of private and public transfers is considered. This methodology concerns the issue that the decision on private transfers by a household's relatives or friends might be affected by whether that household is receiving public transfers or not and that the government has no a priori information whether it is receiving private transfers or not.

In addition, this paper aims to identify the group targets of private and public

transfers before and during the crisis. In contrast to preceding analysis referred above which predominantly considers only the poor as targets, this paper also includes the vulnerable as targets. The vulnerable is a group of people who is not currently poor but faces a high probability of falling into poverty in future (e.g. Morduch 1994; Glewwe and Hall 1998; Chaudhuri 2001; Chaundhuri and Datt 2001; Chaudhuri, Jalan and Suryahadi 2001; Goh, Kang, Sawada 2002; Kang 2002). Having no effective risk-coping devices, this group tends to be vulnerable to economic downturns. Since the poor is not always identical to the vulnerable, households and government need to carefully consider targeting households they are going to provide private and public transfers. Thus, considering targets and evaluating the role of transfers in helping them have important policy implications in the preparation of well-designed social safety nets against a future currency crisis.

Finally, we are going to test crowding-out effect of public transfers. Especially it is compared before and during the crisis. Existing evidence on the extent and magnitude of the crowding-out effect of public transfers are mixed. Some studies find little effect of public transfers on private transfers (e.g., Cox and Jakubson 1995; Rosenzweig and Wolpin 1994) while others (e.g., Cox and Jimenez 1992, 1995; and Cox, Eser, Jimenez 1998) have indicated that the possibility for crowding out to occur can be quite large.

Using the Korean Household Panel Survey (KHPS) data, this paper used the estimation results by seemingly unrelated bivariate probit estimations. These results are quite in contrast to the results of univariate probit estimation. First, this paper shows that the estimation results by a seemingly unrelated bivariate probit model show that private and public transfers are shown to be jointly determined before the crisis but not during the crisis. Second, it is shown that private and public transfers were well targeted to the poor but not to vulnerable groups, especially during the crisis. Third, a strong crowding-out relation between private and public transfers was observed not during the crisis but before the crisis, suggesting collapse of traditional transfer networks in the face of the financial crisis.

The paper is organized as follows. Section 2 provides some theoretical and

empirical background from existing work on public and private transfers. Section 3 gives descriptive evidences and Section 4 discusses the estimation model and results. The final section concludes.

## **2. Background**

### *2.1 Who were poor and vulnerable before and during the crisis?*

Through panel estimation, Goh, Kang, and Sawada (2002) and Kang (2002) show that poor households in Korea were not always identical to vulnerable households before and during the crisis. They used per capita total expenditure as a measurement of standard of well-being and various household characteristics as the independent variables. The main findings are as follows. First, larger households were relatively poor regardless of having the possibility of income diversification or risk-sharing while they were less vulnerable which implies that they tended to be more protected from shortfalls in consumption before and during the crisis. Second, female-headed households were poor before and during the crisis while they were remarkably not more vulnerable before the crisis and their vulnerability disappeared during the crisis. Third, households in rural areas were shown to be poorer than those in urban areas while they became more vulnerable during the crisis.<sup>1</sup> Finally even though other household characteristics such as occupation, age, and education are important to identify the poor but they did not play a significant role in identifying the vulnerable. During the crisis, the estimation result shows that the households with unemployed heads and heads in agriculture/fisheries/part-time, and households with more elderly tended to be poorer while those with more children and highly educated heads tended to be richer.

### *2.2 Why would a household transfer money or goods to other households?*

Previous studies on private transfers identify two motivations of private

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<sup>1</sup> The poverty of female-headed and rural households was not mainly due to gender of heads and residential area, respectively but because of other household characteristics such as age, household size and other characteristics (Kang 2002).

transfers (Cox 1987, 1990): altruism (Becker 1974) and self-interested exchange (Bernheim, Shleifer and Summers 1985). Households transfer resources out of feelings of altruism that implicitly determines the receiving household's consumption. Alternatively, donors give private transfers in order to receive something in exchange for their transfers in times of need. The distinction between the altruistic and the exchange models has an important policy implication (Cox 1987; Cox and Jimenez 1990). Becker (1974), in his altruistic model, argues that public transfer programs will have little effect on the distribution of economic welfare. Under altruism, public transfers reduce the pre-transfer marginal utility of the recipient's consumption. Hence, if government were to tax the donor and give the proceeds to the recipient, the donor's intention to transfer will fade and he may decide to give less private transfers. This cutting back of private transfers in response to public redistribution is called the "crowding out" effect of public transfers. Thus, the Becker's altruism model predicts that public transfers tend to displace private transfers.

On the other hand, exchange-motivated transfers interact with public transfers in a different way. If transfers are motivated by exchange, so that the recipient compensates the donor by providing him some kind of services, public transfers will have little effect on private transfers (Cox 1987). For example, an expansion of social insurances by government, by increasing the size of the risk-sharing pool, may be an effective social safety net device for households. In contrast to the assumption of the Becker's altruism model, the exchange model argues that crowding out between private and public transfers does not necessarily occur. Under exchange motive, public transfers may even increase the probability of receipts by providing donors additional source of income.

### *2.3 Why take private transfers into consideration?*

Understanding private transfers network is important for designing policy interventions since, among other things, private transfers provide social and economic benefits informally which are similar to those of public programs such as unemployment insurance, pension support, educational credit and health insurance. As

such, private transfers may supplement or overlap with public transfers, and, if private donors give less as public transfers increase, the effect of public programs on beneficiaries would be less than originally intended. In short, private transfers may alter the distributional effects of public programs due to crowding-out effect.

Existing evidences on the extent and magnitude of the crowding-out effect of public transfers are mixed. Some studies find that public transfers have little effect on private ones (e.g., Cox and Jakubson 1995; Rosenzweig and Wolpin 1994) while others (e.g., Cox and Jimenez 1992, 1995; and Cox, Eser, Jimenez 1998) have indicated that the possibility for crowding out to occur can be quite large. Cox and Jimenez (1995) estimate that if unemployment insurance system were introduced in the Philippines, private transfers would fall so much that the intended beneficiaries of the program would scarcely be any better off. In contrast, they find that the degree of crowding out associated with pensions is much less significant.

However, in East Asia, many households are likely to be altruistically linked through a widespread and operative informal transfer network. From the assumption that as public transfers increase, altruistically-linked private transfer donors may cutback their private transfer provisions (Cox and Jimenez 1990; Cox, Eser and Jimenez 1998), a government subsidy intended only for those people in need may indirectly benefit donors who are often from the upper-income brackets and protected from exogenous shocks. Hence, a quantitative assessment of the altruistic model is very important. If the assumption of this model is verified, in other words, crowding-out effect is proved to exist, government is then suggested to have careful targeting schemes to ensure the effectiveness of its social safety net programs.

### **3. Descriptive Evidence**

#### *3.1. Data*

The main data source is the Korean Household Panel Survey (KHPS) that covers all prefectures except Jeju-do regardless of household's characteristics and region. Based on a stratified random sampling by street block, this data is consisted of

household- and individual-level multipurpose surveys.<sup>2</sup> This paper employs the survey data for 1995-1998. Each round covers from August to July next year and the 1998 round is considered to reflect the period of the crisis since it covers from August 1997 to July 1998.

### *3.2 The impact of the crisis on household income and consumption*

Table 1 shows trends of per capita household incomes and expenditures with other household characteristics. Total income increased by 8.4 percent between 1995 and 1997. Labor income increased by 6.8 percent while asset income increased by 11.7 percent—constituting 70 and 19 percent of total income in 1997, respectively. Public and private transfers also increased but occupied only a small percentage of total income, i.e., 3.8 percent in 1997.

However, with the onset of the crisis, per capita total income fell by 23.8 percent between 1997 and 1998. The two major income categories—labor and asset income—dropped by 24.4 and 42.0 percent, respectively. Private transfers dropped by 7.8 percent. Public transfers, on the other hand, rose by 29 percent. A decrease of private transfers due to collapse of informal transfer network was offsetted by an expansion of public transfers by Government. Transfer incomes remained the same as before even during the crisis in contrast with the decrease of other incomes.

With the contraction of the economy, rising unemployment and falling income, household expenditure also dropped by 24.7 percent in the same period. The largest drop of 73.1 percent was in the consumption on luxurious items (entertainment and dining out), 19.5 percent in the expenditure on basic needs such as food, housing, clothing and fuel, and 22.9 percent in educational expenditure (which includes expenses for extracurricular activities and additional after-school classes) decreased by 19.5 and 22.9 percent, respectively. The expenditure on food itself dropped only by 14.4 percent.

Although the consumptions on food and education fell in absolute terms during the crisis, they constituted a higher proportion of household budgets—43.4 percent of

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<sup>2</sup> The data structure follows the Panel Survey of Income Dynamics (PSID) data of US.

total expenditure. The share of expenditure on basic needs (food, housing, clothing and fuel) slightly increased from 38.4 and 41.1 percent, in 1997 and 1998, respectively, while that of entertainment and eating out expenditure fell from 22.9 percent to 8.2 percent. This suggests that average households were cutting back consumption on non-essential items to weather the crisis and protect consumptions on food and education.<sup>3</sup>

In addition to income and expenditure, outstanding debt increased by 40.6 percent while the ownership of financial assets remained the same as in 1997. They indicate that households managed a decrease in income through an increase in debt rather than liquidation of their own financial asset which might be from collapse of financial markets (Kang and Sawada 2002).

Table 2 shows that the percentage of households that received private and public transfers had increased since 1995. Throughout the period, there was an increasing trend in the number of households receiving private and public transfers. The percentage of households that received private and public transfers rose from 18.3 and 10.2 percent in 1997 to 21.7 and 16.3 percent in 1998, respectively. This evidence suggests that private and public transfers served as important risk-managing devices during the financial crisis.

Tables 3 and 4 report the percentage of recipients of private and public transfers, respectively, by characteristic of household head. By gender, there was no remarkable change but slightly increase in share of female household heads. Throughout the period, the percentage of male-headed households is higher than that of female-headed households. However, considering that the percentage of female-headed households is just about 10 percent of total sample, it can be said that female-headed households received more private and public transfers relative to male-headed households.

By area, the percentage of rural households is higher than that of urban households and there was no significant change in the distribution of private transfers among these households. In regard to public transfers, while the percentage of urban households dropped by 26.4 percent, the percentage of rural households increased by

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<sup>3</sup> See Goh, Kang and Sawada (2002) for formal analysis on how Korean households managed a

1.8 percent. By occupation, households with unemployed or non-paid heads occupied, not surprisingly, the highest share. In addition, it seems that these households were provided more by private transfers than public transfers during the crisis since their percentage of received private transfers increased by 5.3 percent, contrasts to the 3.2 percent fall in their percentage of received public transfers.

By educational level, household heads with primary or less education covered the largest share, while highly educated household heads received an increased amount of private transfer during the crisis. Overall, there was almost no change observed by educational level even during the crisis.

### *3.3 Private and public transfers as social safety net devices*

The previous two tables show only the number of households which received private and public transfers. In order to assess the role of private and public transfers as social safety net devices before and during the crisis. Tables 5 and 6 show the trend of private and public transfers by per capita pre-transfer income decile.

As shown in Table 5, in terms of per capita pre-transfer income decile, the poorest 10 percent group received the largest amount of private transfers, e.g., 98.6 ten thousand won in 1998. Interestingly, during the crisis, the private transfer network was collapsed to the poorest two deciles –private transfers decreased by 6.4 percent in 1998 while they expanded to the next lowest two deciles. In terms of amount, all income groups except for 30 and 40 percentiles during the crisis received less private transfers than in 1997.

Table 6 shows the trend of public transfers by pre-transfer income decile. In 1998, the poorest 10 percent group received the largest amount, which is composed mainly of supports from government or social organization rather than pensions as Table 8 shows. Moreover, during the crisis, middle-percentile groups tended to receive more public transfers. The amount received by the richest 10 percent dropped by 44 percent and that by the richest 20 percent by 36 percent. In general, the lower income

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decrease in income.

groups tended to receive more public transfers which might contribute to manage a decrease in other income due to the financial crisis. For example, this table shows that the poorest half of total households received more than the average amount of total public transfers, which is 84 ten thousands won.

Table 7 summarizes the categories of public transfers in 1998. The second, third and fourth columns represent the average amount of per capita pensions by category. *National* is national pension. *Civil Servant* is pensions of private schools, civil servants, and militaries, and *Veterans* is veterans' pension. The fifth column, *Support*, represents the support from the government or social organization. The last column, *Insurance*, represents the transfer from employment insurances. The last row gives the mean of public transfers in each category and of total public transfers in 1998.

Supports from the government or social organizations, as expected, played a positive role in supporting the poor and were therefore effective social safety net devices. However, the larger mean value of pension relative to that of supports from the government and social organization suggests that most of public transfers may have served more as sources of extra income rather than as major safety net devices. Employment insurances were negligible since the coverage of an official unemployment insurance program was expanded substantially only after October 1998 (Moon, Lee and Yoo 1999). Thus, since the data used in this paper cover only July 1997 to August 1998 as the crisis period, the contribution of public transfers as social safety nets might be underevaluated.

Table 8 presents the transition matrices of households per capita private and public transfers between years. In each row and column, 0 implies a household did not receive transfers and 1 reflects that a household received transfers. Each cell of each row and column represents the percentage of households who were in row in the previous year  $t$  and in a column in a year later,  $t+1$ . Table 8 indicates that more households that did not received private or public transfers at year  $t$  tend to receive them in year  $t+1$ . For example, 11.3 percent of the household that did not receive private transfers in 1996 received private transfers in 1997. During the crisis, 13.0 percent of the households that did not receive private transfers in 1997 received private transfers in 1998.

For public transfers, even though more households were supported by public transfers, but the share of households was still lower than the households supported by private transfers. For example, out of the households which did not received public transfers in previous year, 6.1 and 10.0 percent of the households in 1997 and 1998.

## 4. Estimation

### 4-1. Empirical Model Specification

Following Cox (1987) and Cox, Eser and Jimenez (1998), we model the latent private transfer income of household  $i$  at time  $t$  as follows:

$$(1) \quad PRT_{it} = \mathbf{a}_1 y_{it} + \mathbf{a}_2 PUT_{it} + X_{it} \mathbf{b} + u_t + \mathbf{e}_{it},$$

where  $PRT$  and  $PUT$  are the latent variables of private and public transfers, respectively, which are observed only when positive. Per capita pre-transfer income is represented by  $y$ . The matrix,  $X$ , includes various household characteristics which determine private transfers. The last term,  $\mathbf{e}$  represents the well-behaved stochastic error term. In order to control for unobserved heterogeneity, we also include time fixed effect,  $u_t$  that is also expected to capture the aggregate effects of the Asian financial crisis.

Note that, in line with the approach developed by Cox (1987), income variable, i.e., per capita pre-transfer income, is included as an independent variable, which is assumed to identify the primary motive of private transfers. A negative parameter on income, i.e.,  $\mathbf{a}_1 < 0$ , indicates that it is altruism-motivated. On the other hand, a positive parameter, i.e.,  $\mathbf{a}_1 > 0$  indicates exchange-motivated private transfers. Also, if the estimated coefficient on public transfers,  $\mathbf{a}_2$ , is negative, it indicates the magnitude of the crowding-out effect of public transfers since it is predicted that under altruism, public transfers reduce pre-transfer marginal utility of the recipient's consumption and consequently, reduce private transfers. If the estimated coefficient is positive, it is called

crowding-in effect of public transfers.

As mentioned, the dependent variable of equation (1) is a latent variable that can only be observed when positive. We estimate the binary transfer functions by defining the following binary variables as:

$$(2) \quad \begin{aligned} r_{it} &= 1 \quad \text{if } PRT_{it} > 0, \\ &= 0 \quad \text{otherwise.} \end{aligned}$$

The standard approach postulated in equation (1) assumes public transfers to be exogenous. Public transfers, however, may also be affected by some factors. Their distribution may be affected by the government's mean-tested targeting—government may provide more public transfers to its target, e.g., poor or vulnerable group, as a part of its social safety net programs. This brings out the endogeneity issue of public transfers, if public transfers are found to be systematically correlated with the unobserved stochastic term,  $\mathbf{e}_{it}$ , which also influences the receipts of private transfers, the estimated coefficients of  $\mathbf{a}_1$  and  $\mathbf{a}_2$  through a simple binary dependent variable model are inconsistent (Wooldridge 2002).

In order to consider the endogeneity issue in estimating equation (1), we assume a linear model of public transfers as follows:

$$(3) \quad PUT_{it} = \mathbf{a}_3 y_{it} + X_{it} \mathbf{g} + v_t + \mathbf{h}_{it},$$

where  $v_t$  indicates time fixed effects and  $\mathbf{h}_{it}$  is the stochastic error term. Note that private transfers are not considered as an independent variable in this equation since the government is not well informed of the status of private transfers.

As in equation (1), the binary transfer functions are defined as:

$$(4) \quad \begin{aligned} p_{it} &= 1 \quad \text{if } PUT_{it} > 0. \\ &= 0 \quad \text{otherwise.} \end{aligned}$$

In Equations (1) and (3), other control variables that reflect household characteristics are included as components of the matrix,  $X$ . First, education variables as proxies of permanent income are considered. Second, age of household head and age of household head squared are also considered. As in Cox (1990), the timing of transfers over the life cycle is important especially for countries facing liquidity constraints. If households are subject to binding borrowing constraints, for example, transfer receipts will be concentrated at early age when current resources are low. Although many developing countries have public pensions, most of these apply only to urban workers in the formal sector and the underdeveloped financial markets of these countries lower the returns of saving for retirement (World Bank, 1989). Thus, old family members are assumed to be dependent on supports from young family members. Third, control variables for household demographic characteristics: residential area, gender of household head, household size, and the number of children and elderly are also included. Each of these variables has a possible interpretation as an indicator of the provision of inter-household services and attention to elderly parents by adult children. Households with more elderly and larger households are expected to be targets of private and public transfers since they have more members to support.

With respect to the estimation method, bivariate probit models are employed which is composed of the first probit model for private transfers of equations (1) and (2) and the second probit model for public transfers of equations (3) and (4). We assume that  $\mathbf{e}_i$  and  $\mathbf{h}_i$  follow the standard bivariate normal distribution with the conditions  $\text{var}(\mathbf{e}_i) = \text{var}(\mathbf{h}_i) = 1$  for identification. In order to estimate parameters with  $\text{cov}(\mathbf{e}_i, \mathbf{h}_i) = \mathbf{r} \neq 0$ , a seemingly unrelated bivariate probit method is used. Using a seemingly unrelated bivariate model, the relative effects of public and private transfers before and during the crisis, respectively, can be compared (Cox and Jimenez 1992, 1995; Cox, Eser and Jimenez 1998).

#### *4-2. Estimation results*

The univariate probit estimation results of private transfer equation are reported

in Table 9 while the seemingly unrelated bivariate probit estimation results are reported in Tables 10 and 11.<sup>4</sup>

The correlation tests of error terms of private and public transfers equations are taken (Tables 10 and 11). Although the hypothesis that this correlation is zero is rejected for before the crisis observation, it is accepted for during the crisis observation. This suggests that private and public transfers were jointly determined before the crisis but not during the crisis. If the correlation is zero, the log likelihood for the seemingly unrelated bivariate probit models is equal to the sum of the log likelihoods of the two univariate probit models.

Strikingly different results on public transfers are estimated. Using univariate probit estimation, positive coefficients on the dummy for public transfers before and during the crisis, respectively, are observed. These results, although the coefficient for during the crisis is not significant, imply a crowding-in effect.

However, using a seemingly unrelated bivariate probit estimation, a significant crowding-out relation between private and public transfers before the crisis is indicated, but this relation disappeared during the crisis. This implies that the informal safety net mechanism was collapsed due to the financial crisis, decreasing the income received by all households.

Larger households are expected to have higher probability to be targets of private and public transfers. The univariate probit estimation results in Table 8, however, show negative and significant coefficients on household size before and during the crisis, which is contrast to our expectation. The seemingly unrelated bivariate estimation results, on the other hand, show negative coefficients for private transfer equation but positive and significant coefficient for public transfer equation before and during the crisis. The coefficient for private transfers equation before the crisis is not significant.

The negative coefficients on pre-transfer income of private and public transfer

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<sup>4</sup> In order to consider household-fixed effect, conditional logit model for private transfers is estimated before the crisis. The results are quite consistent with univariate estimation results. The coefficient for the dummy of public transfers showed positive and significant before the crisis while it was positive but not significant during the crisis.

equations imply altruistically motivated transfers albeit it is not significant for public transfers before the crisis. In terms of occupation of household heads, households whose heads are in agriculture/fisheries/part-time or unemployed had higher probability to receive private and public transfers. Education variables, on the other hand, did not show specific effects on probability to receive private and public transfers except college graduates variable. This suggests that college graduates had higher probability to receive more public transfers before and during the crisis.

Furthermore, the results for other characteristics of household heads, gender and residential area support the findings of other previous papers. Female-headed households and rural households had higher probability to receive more private and public transfers before and during the crisis although the coefficients for private transfers are not significant. Households with more children tended to have less probability to receive private transfers before and public transfers during the crisis. In contrast, households with more elderly tended to have higher probability to receive both private and public transfers before and during the crisis.

Since larger households and urban households were found to be poor but less vulnerable, the estimation results suggest that private and public transfers might have been well targeted only to the poor but not to the vulnerable.

## **5. Conclusion**

Using Korean balanced household panel data during 1995-1998, this paper investigates the inter-relationship between private and public transfers.

One of the key findings is that the estimation results by a seemingly unrelated bivariate probit model, showing that private and public transfers are jointly determined before the crisis but not during the crisis.

Second, while univariate probit estimation results show a crowding-in relation between private and public transfers before the crisis, a strong crowding-out relation is found when the endogeneity of public transfers is considered. Moreover, the observed crowding-out relation before the crisis disappears during the crisis, implying that

informal safety net was collapsed due to the crisis.

Third, other results confirm the findings from other countries. Private transfers were altruistically motivated before and during the crisis. Households with more children tended to have less probability to receive private transfers only before the crisis and public transfers before and during the crisis. Households with more elderly, however, tended to have higher probability to receive both private and public transfers before and during the crisis.

Finally, since larger and rural households were found to be poor but less vulnerable, both private and public transfers seem to have targeted only the poor but not the vulnerable.

In general, we conclude that only poor Korean households were well protected by both inter-household transfers and government transfers during the crisis. This implies that public and private transfers failed to protect vulnerable households, who, we believe, should also be considered as targets particularly during a crisis. In addition, there had been a strong crowding-out relation between private and public transfers observed, suggesting that the government should have careful targeting schemes to prevent such crowding-out effect of its social safety net programs.

**Table 1: Descriptive Statistics for the Entire Sample**

	1995	1996	1997	1998
Age of head	48.2	48.8	49.6	50.2
Household size	3.8	3.9	3.8	3.7
Total income	664.7	760.4	775.7	591.5
Pre-transfer income	643.8	734.4	745.1	562.5
Labor income	483.7	534.6	541.1	408.9
Asset income	118.5	149.6	146.1	84.8
Transfer income	20.7	25.8	29.5	29.5
Private transfers	14.2	19.3	23.0	21.2
Public transfers	6.4	6.4	6.5	8.4
Other income	46.4	53.9	62.6	70.4
Total Expenditure	461.1	393.2	396.2	298.2
Non-durable	334.5	319.6	328.2	253.0
Food	92.9	94.6	96.7	82.8
Food, housing, clothing and fuel	150.5	146.4	152.3	122.6
Education	54.5	56.7	61.9	47.7
Entertainment and eating out	161.3	204.0	90.6	24.4
Durable	123.3	71.2	64.7	40.9
Tax	3.2	3.5	3.7	4.4
Outstanding debt (formal bank loans, informal and personal loans)	197.5	226.6	220.0	309.2
Financial assets (saving accounts, shares, bonds, insurances, and loans)	200.2	238.9	240.3	246.8
Number of households	1978	1978	1978	1978

Note: 1) Income and expenditure values are in 10,000 Korean won per capita household at constant 1995 prices. 2) Some expenditure variables which are not consistently recorded and tend to be overestimated over all waves are excluded from total expenditure. They are expenditures on vacation, and total car maintenance. 3) Tax includes tax on car and residential building and land.

**Table 2. Percentage and Number of Transfer Recipients**

	Private	Public	Total	Households
1995	14.0 (277)	6.6 (131)	19.1 (377)	1978
1996	17.5 (346)	7.3 (145)	22.4 (442)	1978
1997	20.1 (397)	10.2 (202)	24.7 (489)	1978
1998	21.7 (430)	16.3 (330)	30.8 (610)	1978
Total	18.3 (1450)	10.2 (808)	24.2 (1918)	7912

Note: The number of households is in parenthesis.

**Table 3. Percentage of Private Transfer Recipients by Characteristic of Household Head**

		1995	1996	1997	1998
<b>Gender</b>	Female	21.7	23.7	24.0	24.9
	Male	78.3	76.3	76.0	75.1
<b>Region</b>	Urban	36.5	34.7	34.0	33.9
	Rural	63.5	65.3	66.0	66.1
<b>Occupation</b>	Salaried	15.9	12.7	14.1	13.1
	Self-employed	13.0	11.3	10.1	9.1
	Farmers and Fishers	31.4	36.1	37.3	34.0
	Unemployed and non-paid	39.7	39.9	38.5	43.8
<b>Education</b>	Primary or less	48.5	55.9	51.3	49.1
	Junior high school	15.1	14.8	17.0	16.7
	Senior high school	21.3	16.0	19.3	18.3
	Tertiary	15.1	13.3	12.4	16.0

**Table 4. Percentage of Public Transfer Recipients by Characteristic of Household Head**

		1995	1996	1997	1998
<b>Gender</b>	Female	23.4	20.0	21.6	23.5
	Male	76.6	80.0	78.4	76.5
<b>Region</b>	Urban	34.4	27.6	28.2	26.4
	Rural	65.7	72.4	71.8	73.6
<b>Occupation</b>	Salaried	16.0	15.2	14.4	10.0
	Self-employed	9.9	9.7	5.5	11.9
	Farmers and Fishers	30.5	31.7	33.2	34.4
	Unemployed and Non-paid	43.5	43.5	47.0	43.8
<b>Education</b>	Primary or less	46.9	44.8	53.8	50.8
	Junior high school	18.0	20.0	21.1	18.3
	Senior high school	21.1	24.8	14.6	20.1
	Tertiary	14.1	10.3	10.6	10.8

**Table 5. Average Per capita Private Transfers by Decile of Per-capita Pre-transfer Income**

Percentile	1995	1996	1997	1998	Change 96-97(%)	Change 97-98(%)
10	74.2	105.8	105.5	98.6	-0.3	-6.5
20	12.7	22.7	25.4	23.8	11.9	-6.3
30	5.2	10.1	11.9	18.4	17.8	54.6
40	6.1	9.8	2.8	11.1	-71.4	296.0
50	3.6	7.7	8.9	8.0	15.6	-10.1
60	3.1	3.2	8.5	4.8	165.6	-43.5
70	3.6	5.6	9.2	4.2	64.3	-54.4
80	8.9	4.2	21.9	14.3	421.4	-34.7
90	6.9	14.1	12.0	7.8	-14.9	-35.0
100	18.5	9.4	27.6	11.4	193.6	-58.7

Note: Values are in 10,000 Korean won at constant 1995 prices.

**Table 6. Average Per capita Public Transfers by Decile of Per-capita Pre-transfer Income**

Percentile	1995	1996	1997	1998	change 96-97(%)	change 97-98(%)
10	25.8	32.1	22.9	23.5	-28.7	2.6
20	6.1	2.8	9.9	7.4	253.6	-25.3
30	8.5	3.2	7.3	14.5	128.1	98.6
40	0.7	3.2	3.0	9.2	-6.3	206.7
50	2.0	1.7	1.3	11.3	-23.5	769.2
60	2.6	0.5	3.0	0.7	500	-76.7
70	7.8	7.1	3.5	6.0	-50.7	71.4
80	0.5	4.0	1.4	3.6	-65.0	157.1
90	4.0	3.7	5.2	3.7	40.5	-28.9
100	6.5	7.3	7.8	4.4	0.7	-43.6

Note: Values are in 10,000 Korean won at constant 1995 prices.

**Table 7. Average Per capita Public Transfers in 1998 by Category and Decile of Per-capita Pre-transfer Income**

Percentile	Pension			Support	Insurance
	National	Civil Servant	Veterans		
10	0.10	3.32	7.55	12.5	0.16
20	0.75	1.08	0.00	5.57	0.00
30	4.01	4.24	5.24	0.75	0.26
40	3.65	2.57	2.05	0.36	0.58
50	0.00	6.62	4.04	0.63	0.00
60	0.32	0.00	0.17	0.13	0.11
70	0.37	2.33	2.80	0.47	0.00
80	0.61	0.92	1.75	0.12	0.26
90	0.16	2.70	0.00	0.86	0.00
100	0.50	2.99	0.87	0.07	0.00
Mean	1.04	2.67	2.44	2.15	0.14

Note: Values are in 10,000 Korean won at constant 1995 prices.

**Table 8: Transition Matrices of Private and Public Transfers**

**Private Transfers**

		1997				1998			
1996		0	1	Total	1997		0	1	Total
	0	88.7	11.3	100		0	87.0	13.0	100
	1	38.7	61.3	100		1	43.6	56.4	100
Total	79.9	20.1	100	Total	78.3	21.7	100		

**Public Transfers**

		1997				1998			
1996		0	1	Total	1997		0	1	Total
	0	93.9	6.1	100		0	90.0	10.0	100
	1	37.9	62.1	100		1	24.3	75.7	100
Total	89.8	10.2	100	Total	83.2	16.7	100		

**Table 9: Univariate Probit Estimation of Private Transfers**

	Before the Crisis		During the Crisis	
	Coef.	z-value	Coef.	z-value
Pre transfer income/10 <sup>3</sup>	-0.15	-3.70	-0.28	-2.24
Public transfers	0.20	2.64	0.19	1.81
=1 if the head is self-employed	0.09	1.29	-0.11	-0.96
=1 if the head is in agriculture/ fisheries/part-time	0.50	7.33	0.45	3.94
=1 if the head is unemployed/ non-paid	0.76	9.73	0.63	5.10
Household size	-0.07	-3.01	-0.16	-3.89
Number of children below 15	-0.07	-2.09	0.05	1.05
Number of elderly above 60	0.20	6.87	0.19	3.81
Age of the head	-0.06	-4.52	-0.06	-2.32
Age squared/10 <sup>3</sup>	0.62	4.84	0.56	2.51
=1 if the head is a junior high school graduate	-0.05	-0.70	0.06	0.51
=1 if the head is a senior high school graduate	-0.13	-1.74	-0.19	-1.52
=1 if the head is a college graduate or above	0.14	1.60	0.24	1.66
=1 if the head is female	0.24	3.25	0.20	1.68
=1 if the head resides in urban	-0.05	-0.97	-0.17	-2.20
=1 for 1996	0.16	2.99		
=1 for 1997	0.24	4.44		
Constant	0.29	0.80	0.77	1.19
Number of Observation	5696		1905	
Log likelihood value	-2045.83		-760.96	

**Table 10: Seemingly Unrelated Bivariate Probit Estimation  
(Before the Crisis)**

	Private Transfers		Public Transfers	
	Coef.	z-value	Coef.	z-value
Pre transfer income/10 <sup>3</sup>	-0.16	-3.90	-0.11	-1.74
Public transfers	-0.72	-2.93		
=1 if the head is self-employed	0.07	0.87	-0.17	-1.47
=1 if the head is in agriculture/ fisheries/Part-time	0.53	6.86	0.30	3.20
=1 if the head is unemployed/ non-paid	0.85	9.80	0.66	5.74
Household size	-0.04	-1.47	0.13	4.26
Number of children below 15	-0.08	-2.08	-0.09	-1.82
Number of elderly above 60	0.22	6.59	0.13	2.89
Age of the head	-0.07	-4.35	-0.04	-1.75
Age squared/10 <sup>3</sup>	0.72	4.75	0.47	2.54
=1 if the head is a junior high school graduate	-0.001	-0.02	0.22	2.06
=1 if the head is a senior high school graduate	-0.10	-1.21	0.12	1.00
=1 if the head is a college graduate or above	0.18	1.97	0.29	2.17
=1 if the head is female	0.30	3.35	0.35	3.20
=1 if the head resides in urban	-0.08	-1.50	-0.20	-2.66
=1 for 1996	0.17	3.47	0.05	0.86
=1 for 1997	0.27	5.36	0.18	3.12
Constant	0.35	0.86	-1.71	-2.97
Number of observation		5696		
Log likelihood value		-3404.70		
Disturbance correlation (Rho)		0.51		
Chi2 (Prob)		10.92 (0.00)		

Note: Chi2 and Prob represent Wald test statistics and probability to be higher than Chi2 for Rho=0 hypothesis.

**Table 11: Seemingly Unrelated Bivariate Probit Estimation  
(During the Crisis)**

	Private Transfers		Public Transfers	
	Coef.	z-value	Coef.	z-value
Pre transfer income/10 <sup>3</sup>	-0.28	-2.06	-0.56	-3.16
Public transfers	0.17	0.33		
=1 if the head is self-employed	-0.11	-0.95	0.19	1.45
=1 if the head is in agriculture/ fisheries/Part-time	0.46	3.83	0.47	3.57
=1 if the head is unemployed/ non-paid	0.63	4.93	0.50	3.54
Household size	-0.16	-3.48	0.18	4.62
Number of children below 15	0.06	1.00	-0.16	-2.95
Number of elderly above 60	0.19	3.51	0.16	2.97
Age of the head	-0.06	-1.78	-0.12	-5.05
Age squared/10 <sup>3</sup>	0.57	1.81	1.32	5.73
=1 if the head is a junior high school graduate	0.06	0.51	0.21	1.69
=1 if the head is a senior high school graduate	-0.19	-1.50	0.10	0.76
=1 if the head is a college graduate or above	0.24	1.60	0.33	2.05
=1 if the head is female	0.20	1.54	0.43	3.32
=1 if the head resides in urban	-0.17	-1.79	-0.47	-5.46
Constant	0.78	0.99	0.91	1.34
Number of observation		1905		
Log likelihood value		-1420.31		
Disturbance correlation (Rho)		0.008		
Chi2 (prob.)		0.0008 (0.98)		

Note: Chi2 and Prob represent Wald test statistics and probability to be higher than Chi2 for Rho=0 hypothesis.

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