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Transfers and Labor Market Behavior of the Elderly in Developing Countries: Theory and Evidence from Vietnam

Chung Tran^{*}

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Abstract

In this paper I analyze the crowding-out effects of public transfers on labor supply of the elderly in the context of developing countries. I argue that the interactions between private transfers received and labor supplied by the elderly affect the opportunity cost of retirement and therefore magnify the crowding-out effects of public transfers on the labor supply of the elderly. Using household survey data from Vietnam, I find the evidence supporting this hypothesis. That is, the crowding-out effect is about two times larger when accounting for the endogeneity of private transfers, which is caused by the interactions of private transfers and the labor supply.

JEL Classification: H31, H55, I38, J14, J22, J28

Keywords: Altruism, Crowding-out, Social Security, Retirement, Transfers.

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1 Introduction

People in developing countries are exposed to a severe shortage of institutionalized risk-sharing mechanisms against longevity risks like public social security programs or private annuity markets. Consequently, old people rely mainly on family support systems. The flow of private transfers from young to old agents such as remittances from children who live in urban areas or abroad to parents who live in rural areas are widely observed (e.g. see Cox and Jimenez (2006), Cox (2004) and World-Bank (1994)). However, the family support system to the old fails to provide full insurance. It alone fails to pool risk efficiently over different families and it is vulnerable to economic and social changes like migration and aging. As a consequence, many of the elderly who do not have family support or other assets have to work as long as they are physically capable. There is evidence that there are a significant number of people working at very high ages in developing countries such as Indonesia (McKee (2006)) and Vietnam (see figure 1). The failure of the private sector in providing full social insurance in developing countries raises the role of government in protecting people at older ages. Recently, several developing countries have reformed their social security systems and extended the coverage of public transfer programs to uncovered elderly workers and more countries consider instituting similar programs.

There is a huge literature analyzing the crowding-out effects of public transfer programs (e.g. see Diamond (1965), Barro (1974), Becker (1974), Auerbach and Kotlikoff (1987), Imrohoroglu, Imrohoroglu and Joines (1999), Fuster (1999), Fuster, Imrohoroglu and Imrohoroglu (2007), and more recently Jung and Tran (2007)). Particularly, there is an empirical literature examining the crowding-out effects of public transfers in the context of developing countries. Public transfers crowding out private transfers have been reported for Peru, the Philippines and South Africa (see Cox and Jimenez (1992), Cox and Jimenez (1995) and Jensen (2003)). There is also evidence that the introduction of social pension programs crowds out labor supply of the elderly in Brazil (Filho (2004)). In addition, there is a strand of literature analyzing the relationship between private transfers and labor supply of the elderly. Cameron and Cobb-Clark (2001, 2002, 2005) study to what extent family support in the form of cash transfers and living arrangements influence the labor market behavior of old-age Indonesian men and find no significant evidence. Even though the pairwise relationships, that between public and private transfers, that between public transfers and labor supply, and that between private transfers and labor supply have been studied by the empirical literature focusing on developing countries, the

dynamics of public transfers, private transfers and labor supply are usually abstracted. McKee (2006) is known as the first attempt to study public transfers, family support and labor supply of the elderly together in a dynamic programming framework. He finds that family support and public pension benefits have significant effects on the labor market behavior of older men in Indonesia, which contradicts the findings of Cameron and Cobb-Clark.

So far the previous studies understate the importance of interactions between private transfers received and labor supplied by the elderly when evaluating the crowding-out effects of public transfer programs. In my opinion, accounting for these interactions is essential because these interactions result in a change in opportunity cost of retirement and then labor market behavior of the elderly. The following is a main mechanism. As young individuals observe that their old parents are healthy and still able to work they might think that their parents need less support; therefore they would transfer less to their parents. On the other hand, as the elderly are aware of the fact that their labor decision would affect the amount of transfers received from their children, the elderly would have to take into account the potential effects of their labor/leisure choice on the amount of private transfers. That is, if the elderly decide to work longer they would increase their labor earnings but lose not only the utility derived from consuming leisure time but also a chance to receive more private transfers from children. The elderly therefore should optimize their labor supply while taking into account both forgone labor earning and the forgone amount of private transfers from their children. In such environment, where children actually pays for a part of the cost of the parent's leisure, the opportunity cost of not working is lower for the elderly. Consequently, the income effect on labor supplied by the elderly is magnified.

In the context of developing countries, where the flows of private transfers are important, these dynamics has important implications for evaluating the effects of public transfer programs on labor market behavior of the elderly. However, little is known about the role of these interactions. Part of the problem is due to the lack of awareness of the importance of accounting for these interactions in the empirical literature in developing countries. Furthermore, there is a lack of adequate data because there are very few data sets available containing information about public transfers, private transfers, and labor supply.

This paper makes two key contributions. First, I use a simple overlapping generation model to formulate the interactions between transfers received and labor supplied by the elderly and to show that these interactions results in a decline in opportunity cost of retirement, which then magnify the crowding-out effects of public transfers on labor supply of the elderly. Second,

using the data from a Vietnam household survey I find the evidence supporting this hypothesis. That is, not controlling for endogeneity of private transfers received by the elderly, which is caused by these interactions, results in a downward bias in estimating these crowding-out effects. Particularly, when the endogeneity of private transfers is taken into account, the estimate of the marginal effect of public pensions on retirement is about two times larger and that of inter-household transfers on retirement is about at least ten times larger. In addition, I find the evidence supporting the crowding-out hypothesis. Particularly, an increase in public pension income or inter-household transfer income by 100 dollar increases the probability to retire by either 7% or 13%, respectively.

The paper is organized in the following way. The theoretical framework is presented in section 2. The econometric specification and estimation strategy are described in section 3. An overview of Vietnam's economy and the institutionalized social security system of Vietnam is presented in section 4. Details on the Vietnam Living Standard Survey 1998 and a descriptive analysis of the data are in section 5. Empirical results and discussions are presented in section 6. I conclude in section 7.

2 Theoretical Framework

In this section, I develop a simple model to investigate the role of interactions between private transfers from young children and labor decisions of the old parent in evaluating the crowding-out effects of public transfers. I consider a partial equilibrium environment with an agent, who lives for two periods: young and old, who derives utility from consumption when young and from consumption and leisure when old. The agent supplies labor inelastically when young and elastically when old. The agent has a child at the end of the young period and becomes a parent when old. The child is assumed to be altruistic towards the parent so that the child is willing to transfer a part of his income to support the parent. The agent receives public transfers from government (a pension) and private transfers from a child when old. The agent chooses consumption when young and old and labor supply when old to solve a utility maximization problem according to

$$\max_{c_i^y, c_i^o, l_i^o} \{ \log c_i^y + \beta (\log c_i^o + \kappa \log l_i^o) \}, \quad (1)$$

subject to the two period budget constraints

$$\begin{aligned} c_i^y + s_i &= w \\ c_i^o &= (1+r)s_i + w(1-l_i^o) + P_i + T_i, \end{aligned} \tag{2}$$

the time constraint

$$0 < l_i^o \leq 1, \tag{3}$$

and a transfer rule of the child

$$T_i = T(c_i^o), \tag{4}$$

where c_i^y and c_i^o are consumptions when young and old, respectively; l_i^o is leisure when old; β is the discount factor; κ is a weight on the parent's utility from leisure; w is the market wage rate; $1+r_t$ is the market interest rate; P_i are government transfers; T_i are private transfers received from his child. It is assumed that the private transfers is a non-increasing function of the parent's consumption when old. The first derivative of the private transfer function is non-positive $\frac{\partial T[c_i^o]}{\partial c_i^o} \leq 0$. This assumption implies that the child's decision on private transfers is responsive to the parent's choice. The child tends to transfer less if the parent increases its consumption when old.

A solution to the household problem depends on how the parent reacts to transfers from the child. There are two possible cases. First, there are interactions between private transfers received from the child and labor supply by the parent. It is the case that the parent is fully aware that the child is altruistic and transfers money to support the parent when old. The rule that his child follows to react to consumption when old is known by the parent. In this case, the parent treats private transfers as an endogenous variable and takes into account the transfer rule when solving the household utility maximization problem. Second, there is no interaction. In this case, the child's decision on private transfers is not responsive to the parent's decision. A change in the level of the parent's consumption has no effect on the amount of transfers received by the parent. It implies that the parent cannot manipulate the decision of the child to get more transfers from the child. In this case the parent treats private transfers as an exogenous variable and takes private transfers as given when solving for the optimal consumptions and leisure.

Private transfers as an endogenous variable

When private transfers are treated as an endogenous variable, the optimal decision rules on

consumption and leisure have a form of

$$c^y = \frac{\left(1 - \frac{\partial T[c^o]}{\partial c^o}\right)}{\beta(1+r)} c^o \quad (5)$$

$$c_i^o = \frac{1}{1 + \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right) \left(\frac{1}{\beta} + \frac{\kappa}{(1+r)}\right)} [(1+r)w + w] + \frac{1}{1 + \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right) \left(\frac{1}{\beta} + \frac{\kappa}{(1+r)}\right)} (P_i + T_i), \quad (6)$$

$$l_i^o = \frac{\kappa \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right)}{1 + \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right) \left(\frac{1}{\beta} + \frac{\kappa}{(1+r)}\right)} [(1+r)w + w] + \frac{\kappa \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right)}{1 + \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right) \left(\frac{1}{\beta} + \frac{\kappa}{(1+r)}\right)} (P_i + T_i). \quad (7)$$

Private transfers as an exogenous variable

When private transfers are independent of the parent's choice, the parent just ignores the transfers rule. Optimal consumption and leisure are simplified to

$$c^y = \frac{1}{\beta(1+r)} c^o \quad (8)$$

$$c_i^o = \frac{1}{1 + \frac{1}{\beta} + \frac{\kappa}{(1+r)}} [(1+r)w + w] + \frac{1}{1 + \frac{1}{\beta} + \frac{\kappa}{(1+r)}} (P_i + T_i), \quad (9)$$

$$l_i^o = \frac{\kappa}{1 + \frac{1}{\beta} + \frac{\kappa}{(1+r)}} [(1+r)w + w] + \frac{\kappa}{1 + \frac{1}{\beta} + \frac{\kappa}{(1+r)}} (P_i + T_i). \quad (10)$$

Proposition 1 *The crowding-out effect of public transfers is larger when inter-household transfers are endogenous.*

Proof. In the model, $\frac{\kappa \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right)}{1 + \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right) \left(\frac{1}{\beta} + \frac{\kappa}{R}\right)}$ is the marginal effect of public transfers when private transfers are endogenous. The term $-\frac{\partial T(c_i^o)}{\partial c_i^o}$ captures the feedback effect. When private transfers are exogenous that feedback effect is ignored, the term $-\frac{\partial T(c_i^o)}{\partial c_i^o}$ is redundant and the marginal effect becomes $\frac{\kappa}{1 + \frac{1}{\beta} + \frac{\kappa}{R}}$. Let $g(x)$ denote $\frac{\kappa(1+x)}{1 + \left(\frac{1}{\beta} + \frac{\kappa}{R}\right)(1+x)}$ where x denotes $-\frac{\partial T(c_i^o)}{\partial c_i^o}$. Since $-\frac{\partial T(c_i^o)}{\partial c_i^o} > 0$ then $x > 0$. Since $\frac{\partial g(x)}{\partial x} = \frac{\partial \left(\frac{\kappa(1+x)}{1 + \left(\frac{1}{\beta} + \frac{\kappa}{R}\right)(1+x)}\right)}{\partial x} > 0$, then $g(x)$ is an increasing function in $x \geq 0$. Hence, for every $x > 0$, it is always true that $g(x) > g(0)$. As a result, the following inequality always holds

$$\frac{\kappa \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right)}{1 + \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right) \left(\frac{1}{\beta} + \frac{\kappa}{R}\right)} > \frac{\kappa}{1 + \frac{1}{\beta} + \frac{\kappa}{R}}.$$

■

This result implies that when the parent does take into account the transfer rule of his child, the marginal effect of public transfers on labor supply when old is magnified. The intuition

for this result is clear. The opportunity cost of enjoying leisure time when old is the forgone labor earning. As the child is altruistic and his transfer decision is responsive to the parent's choice, the child will increase transfers to the parent in order to compensate the parent for income losses from reducing labor supply to consume more leisure. In this environment, the child actually pays for a part of the cost of the parent's leisure. The parent's opportunity cost of not working when old is lower when private transfers are endogenous rather than exogenous. The income effect on the demand for leisure is therefore larger when private transfers are endogenous. Consequently, the parent tends to consume more leisure when more income from public transfer programs is available. Thus, the marginal effect of public transfers on labor/leisure choice is magnified when there are interactions between private transfers received and labor supplied by the elderly.

This result has an implication for empirical studies on the crowding-out effects of public transfers. In developed countries, where the flows of private transfers from children to parents are relatively small and private transfers do not play a significant role in determining labor/leisure choice or retirement of the elderly, it might be fine to ignore these dynamics when studying labor market behavior of the elderly. However, in developing countries, where there are relatively large flows of transfers across households and generations, it is essential to take into account the interactions between transfers received and labor hours supplied by the elderly when evaluating the effects of public transfer programs.

Proposition 2 *Public and private transfers crowd out labor supply when old.*

Proof. Since the terms $\frac{\kappa \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right)}{1 + \left(1 - \frac{\partial T[c^o]}{\partial c^o}\right) \left(\frac{1}{\beta} + \frac{\kappa}{R}\right)} > 0$, the demand for leisure of the elderly is an increasing function of public transfers and inter-household transfers. ■

This result is consistent with the previous literature on the crowding-out effects of public transfers.

3 Empirical Specification

As documented in the literature, motives for private transfers may not be purely altruistic (e.g. see Hurd (1987), Cox (1987) and Altonji and Kotlikoff (1997)). The motives for private transfers could be different such as a means to secure an inheritance from parents, part of an exchange of services, joy of giving, social norms, or a risk-sharing agreement. In addition, interactions between parents and children and even among children are dynamic rather than static as

assumed in the theoretical model. As a consequence, interactions between parent's labor/leisure choice and private transfers are far more complex. However, as long as old agents could strategically act to attract more transfers from their children, private transfers are endogenously determined. As a result, it is necessary to control for endogeneity of private transfers when estimating the effects of public transfers on the labor supply decision of the elderly. Otherwise, these effects would be under-estimated. This section aims to explore that problem with data from a household survey in Vietnam. Particularly, it will focus on two questions: First, is there any evidence on the interaction between the labor choice of the elderly and inter-household transfers, which leads to endogeneity of inter-household transfers received by the aged parents? Second, to what extent are the crowding-out effects underestimated when the endogeneity issue is ignored?

An Empirical Model of Retirement Choice

It is assumed that every old agent i has a latent demand for leisure l_i^* , which governs the retirement choice. The latent demand is assumed to be a function of public transfers, inter-household private transfers, and incomes. There is no restriction on the domain of latent demand for leisure and l_i^* could have any value. On the supply side, however, the supply of leisure time is naturally limited. For example, there is a maximum of 24 hours available per a day and 7 days available per week. Agents are naturally restricted to consume at most the natural limit $l_i^* \leq \bar{l}$ and $1 - l_i^*$ is labor supply. When the latent demand for leisure is equal to or greater than the upper time limit $l_i^* \geq \bar{l}$, it means that agents choose not to work. The upper time limit can be normalized to 0 so that a discrete choice model of retirement is given by

$$\text{Retirement} = \begin{cases} 1, & \text{if } l_i^* \geq 0 \\ 0, & \text{otherwise.} \end{cases}$$

The latent demand for leisure is determined according to

$$l_i^* = \gamma_o + \gamma_1 T_i + \gamma_2 P_i + \gamma_3 X_i^{dc} + \gamma_4 X_i^p + \gamma_5 X_i^h + \varepsilon_i^1, \quad (11)$$

where P_i is the amount of government transfers; T_i is the amount of inter-household transfers; X_i^{dc} is a vector of variables representing characteristics of other household members such as human capital and health status which control for within-household transfers; X_i^p is a vector of characteristics of the parent controlling for human capital and income; components of X_i^h

are overall characteristics of the household such as types of house and value of durable goods; finally, ε_i^1 is random error term. X_i^{dc} , X_i^p and X_i^h are used to control for the agent's income and the flows of intra-family transfers as well as other unobservable household state variables;

The coefficient γ_i measures the marginal effects of a corresponding regressor, of which γ_1 and γ_2 are parameters of interests capturing the marginal effect of inter-household transfers and that of public transfers on individual retirement choice, respectively. As argued in the theoretical part, since transfers have positive effects on the elderly's demand for labor coefficients γ_1 and γ_2 both are expected to have positive signs.

Endogeneity of Inter-household Transfers and a Set of Instrument Variables

Assuming that all regressors are exogenous, the model can be estimated directly by any standard estimation method. That is, either OLS or probit or logit estimation method yields consistent estimates. However, the assumption that inter-household transfers are exogenous is questionable. As argued in the previous section, once parents could act strategically to draw more transfers from their children, inter-household private transfers should be treated as an endogenous variable. In this case, the latent demand for leisure (or retirement decision) and inter-household transfers are jointly determined. Ignoring endogeneity of inter-household transfers results in inconsistent estimates.

I assume that private transfers to the parent is a function of the parent's latent demand for leisure and other characteristics of parents and characteristics of the child household who transfers to the parents as

$$T_i = \delta_0 + \delta_1 l_i^* + \delta_2 X_i^{ic} + \delta_3 X_i^p + \varepsilon_i^2, \quad (12)$$

where X_i^{ic} is a vector of characteristics of the independent children controlling their human capital and wealth; X_i^p is a vector of characteristics of the parent controlling human capital, income and wealth of the parent; ε_i^2 is random error term; $(\varepsilon_i^1, \varepsilon_i^2)$ are zero-mean normally distributed and independent of X_i^{ic} , X_i^p , X_i^{dc} and P_i . In this model, T_i is endogenous if ε_i^1 and ε_i^2 are correlated.

When inter-household transfers are an endogenous variable, it is necessary to control for the problem of endogeneity. Identification of the model requires finding a set of valid instruments that can be reasonably excluded from equation (11). My instrumental variable strategy relies on the assumption on the inter-household private transfer rule. I use a set of characteristics variables of children who live outside of the parent household to create instruments for T_i . The

implicit assumption is that characteristics of these children only affect the parent choice of labor/leisure indirectly via transfers. The above transfer equation reflect this assumption.

The set of instruments are obtained from substituting the latent demand for leisure into the equation of inter-household private transfers as

$$T_i = \beta_0 + \beta_1 P_i + \beta_2 X_i^{ic} + \beta_3 X_i^{dc} + \beta_4 X_i^p + \beta_5 X_i^h + \varepsilon_i^3. \quad (13)$$

Private transfers are expressed as a linear approximation of all the right hand side variables, which are all possible instrument variables.

Testing of Endogeneity

Endogeneity of inter-household transfers is testable. I apply the Smith-Blundell for testing the exogeneity of inter-household private transfers. Under the null hypothesis of the Smith-Blundell test, the model is appropriately specified with all regressors as exogenous. Under the alternative hypothesis, the suspected endogenous variable (inter-household transfers) is expressed as a linear projection of a set of instruments. The residuals obtained from the null hypothesis model are included. If private transfers are exogenous, the residuals should have no explanatory power.

Estimation Method

When inter-household private transfers are endogenous, a two-stage procedure is commonly used to estimate the effect of transfers on retirement. In the first stage, an OLS regression of equation (13) gives consistent estimates and predicted inter-household transfers \widehat{T}_i . In the second stage, the predicted values of inter-household transfers \widehat{T}_i are used in replacing the actual values of inter-household transfers T_i . The model of retirement choice with projected inter-household transfers could be estimated by either OLS or probit. As ε_i^1 is normally distributed, a probit analysis is employed.

4 Social Security Programs in Vietnam

Before 1995, the social security system of Vietnam consisted of two main programs, which are pensions and health care. The Ministry of Finance was responsible for collecting contributions and making outlays to the social security agency to pay for beneficiaries. The Ministry of Health was responsible for providing free health care for all people. The pension system was designed for employees in the public sector sectors including state owned enterprises and the

military force. The contribution rates were around 4.7% of basis wage. The social security system was in high deficit. Benefit payments relied mainly on subsidies from the government budget, which accounted for around 80% of annual social security payments.

After 1995, the social security has been reformed to sustain social security funding and to meet the increasing needs of workers in the private sector. The new laws including the Labor Code, the Cooperatives Law, the Regulations on Social Insurance and Regulations on Social Insurance for Armed Forces and Public Security Personnel had been issued between 1994 and 1996 in order to provide a legal framework for the establishment of a new social security system that is aimed at gradually extending coverage to workers in the private sector. According to the reform, the social security system in Vietnam is organized into 3 main components. The first component is social insurance which includes public pensions, public insurance programs for health, unemployment and disability. The second component contains all transfer payment programs to war veterans and deceased veterans' families and social difficulty relief program. The last component consists of all social relief programs such as regular social assistance, emergency assistance and starvation relief.

In 1995 the government established an independent government agency called Vietnam Social Security with responsibilities for running the social security system. The social security fund was established based on the pay-as-you-go principle and was separated from the government budget operations. Under the new laws, a compulsory contribution-based social insurance system also covers all private sector workers working in enterprises with 10 or more employees. Employers contribute 10 % of their payroll and employees contribute 5 % of their monthly wage for pensions and survivor's schemes. The replacement rate is around 75% of average wages over the last 5 years prior to retirement. Even with these new arrangements, the government subsidizes social security when there is a deficit.

5 Data

5.1 Vietnam Living Standard Surveys

Vietnam is chosen as a case study for an empirical investigation. The country is a typical example of a low-income country, which has significant private transfers and a large fraction of the elderly participating in the labor force while public pensions play a minor role. Data used in the analysis come from the Vietnam Living Standard Survey (VLSS) which was conducted by the General Statistic Office of Vietnam with technical assistance from the World Bank in

1997 – 98. The survey sample consists of 6000 representative households. The data from the Vietnam Living Standard Survey in 1998 contain sufficient information on demographics, employment, income, assets, health status, and transfers.

The data used for estimations are a sub-sample of the VLSS 1998 data set. A sample of the elderly are extracted from the data set in the following way. I define elderly as being older than 55 for women and older than for 60 men but not older than 80. The justifications for these lower bounds come from the context of Vietnam. According to the Labor Code, the eligible ages for pension benefits are 55 and 60 for women and men, respectively. The public pensioners are allowed to work in the private sector while receiving pension benefits. So, the ages starting from 55 for women and from 60 for men are critical time to consider a retirement decision. The justification for the upper bound is from the fact that retirement and labor supply choices are not relevant at very high ages. When agents are over the age of 80, they are not physically able to work and the marginal cost of leisure is close to zero. As seen in figure 1, the labor force participation rate is almost zero after the age of 80. In addition, there are as many as 500 the elderly who do not have any member living outside are excluded from the sample. My identification strategy requires the elderly to have at least one child living separately; otherwise I can't find instrument variables for inter-household private transfers. Finally, all observations with some missing value are also excluded. The actual size of the sample used in the estimation drops to 2565 observations.

5.2 Data Description

Labor Supply

The overall picture of labor market behavior in Vietnam is described in figure 1. Age groups from 30 to 40 are most active in the labor force. People participate in the labor force until very high ages.

Labor market behavior of the elderly in Vietnam is described in the first panel of figure 1 and in table 1. Overall, only 49.6% of the Vietnamese elderly choose to retire and the others are still active in the labor force. Retirement is heterogeneous by gender. Women retire earlier than men.

The retirement rate increases with age. The retirement rate rises from 36% at age of 60 – 64 to 72% at age of 75 – 80. Strikingly, more than 37% of elderly even at age 70 or older can not afford to retire and remain in the labor force.¹

¹Life expectancy at birth male/femal (years) is 69/74 in Vietnam years in 2002. (source:

Labor Market Behavior



Source: Vietnam Living Standard Survey 1998 (VLSS)

Figure 1: Labor Force Participation

Table 1: Retirement by Age and Gender

AGE	MALE			FEMALE			BOTH			N
	No	Yes	Yes(%)	No	Yes	Yes(%)	No	Yes	Yes(%)	
55-59	0	0		282	147	34.27	282	147	34.2	429
60-64	225	102	33.22	228	157	40.78	453	259	36.4	712
65-69	169	147	46.52	159	193	54.83	328	340	50.9	668
70-74	92	96	51.06	72	185	71.98	164	281	63.1	445
75-80	42	81	65.85	30	158	84.04	72	239	72.2	311
N	528	426	44.65	771	849	52.14	1299	1266	49.4	2565

Transfers

Inter-household transfers are overwhelmingly dominant over public transfers in Vietnam. The coverage of social security system is relatively low compared to that of the family support system. Only 11.6% of the elderly received public social security. Meanwhile, about 26% of the elderly received financial support from children and relatives. However, the amount of government transfers is also smaller than that of private transfers. On average public transfers are 1.4 times larger than the average private transfers.

Table 2: Transfers to the Elderly by Sources

AGE	PRIVATE			PUBLIC		
	Transactions	%	Amount	Transactions	%	Amount
55 – 59	101	23.54	173.7	64	12.92	203.9
60 – 64	151	21.21	189.9	105	14.75	297.3
65 – 69	181	27.10	204.6	67	10.03	305.9
70 – 74	140	31.46	270.9	42	9.44	309.6
75 – 80	101	32.48	283.9	20	6.43	329.7
Average	674	26.28	224.6	298	11.62	306.0

Unit: US dollar in 1998

Interestingly, the fraction of the elderly receiving private transfers increases while the fraction of the elderly receiving public transfers decreases over age. This is a signal that private transfers are used to substitute the missing public transfers.

5.3 Specification of Variables

In the following, I will describe how main variables are calculated.² The data has information on private inter-household transfers to each member of a household. Private transfers to the elderly (Inter-household transfers) are calculated by adding up all inter-household transfers

<http://www.who.int/countries/vnm/en/>

²All variables measured in terms of local currency values are converted to the corresponding US-dollar value in 1998.

from all sources to each elderly members of the household. Unfortunately, public transfers to individual members of a household are not available but only to the household as a whole. I assume that old individuals in a household have an equal share of the total amount of public transfers to the household regardless their genders. That is, public transfers to an individual elderly (Pension) are measured in terms of public pensions per a old individual in a household.

The data on retirement choice (Retirement) are constructed in the following way. The data have information about employment status in the last 12 months. Particularly, the survey asked questions whether an individual work or not, if not, why not and if yes, how many hours. I use this information to partition the elderly into two groups, one that contains all the elderly who do not participate in the labor force and one that contains the elderly who do. Some of the elderly do not participate in the labor force because they failed to find a job even though they want to work. These elderly are forced to retire. The data contain questions on reasons why an elderly person does not work. I use this information to identify who is forced to retire. There are only 9 individual elderly in the sample failing to find a job and being forced to retire. Since it is relatively small, it is fine to remove all of these elderly from the sample.

The vector of the elderly's characteristics (X^p) includes variables reflecting the main characteristics of the elderly such as the household position, sex, age, marital status, educational achievement, health status and financial responsibility. The vector of main characteristics of co-residing members (X^{dc}) consists of household size, average age, average education achievement, number of household members older than 80 years old, number of household members younger than 10 years old. The vector of main characteristics of household (X^h) contains variables of durable goods, housing condition and place of residence. The vector of main characteristics of non-coresiding members (X^{ic}) includes number of non-coresiding members, average age, average educational achievement, numbers of non-coresiding members living aboard and numbers of non-coresiding members living in big cities. A full list and definition of variables used for my econometric models are presented in table 3. Summary statistics of these variables are reported in table 4.

6 Empirical Results

Endogeneity of inter-household transfers

The Smith-Blundell test statistic for exogeneity is 4.684869 with a P-value of 0.0304. The Smith-Blundell's test of exogeneity rejects the exogeneity of inter-household transfer variable.

Table 3: Definition of Variables

Variables	Definition
Retirement	Dummy variable, = 1 if retired
Inter-household transfers	Private transfers received by the elderly
Pension	Public transfers including pension and other government subsidies
Characteristics of the Elderly (X^p)	
Head	Dummy variable for household head
Sex	Dummy gender
Age	Age of the elderly
Age2	Age squared
Marital status	Dummy variable for marital status = 1 if married and = 0 otherwise
Co-residing spouse	Dummy variable = 1 if spouse is alive and a co-resident
Educational achievement	Dummy variable: primary = 1, secondary = 2, tertiary = 3, and = 0 otherwise
Poor health	Dummy variable, = 1 if health condition is poor
Transfers out	Dummy variable, =1 if the elderly transfers to household members living outside
Characteristics of Co-residing Members (X^{dc})	
Average Education of others	Average educational achievements of co-residing members
Household size	Number of household members
Number of young	Number of household members younger than 10 years old
Number of old	Number of household members older than 80 years old
Number of unemployment	Number of household members unemployed
Overall Characteristics of Household (X^h)	
Sharing house	Dummy, =1 if sharing a house with others
Durable	Money value of key durable goods
Urban	Dummy =1 if living area is urban
Characteristics of Independent Children (X^{ic})	
Average age of ncm	Average age of family members living out of the elderly's household
Average education of ncm	Average education achievement of the non-coresiding member
Number of non-coresiding members (ncm)	Total number of family members living outside
Number of ncm living abroad	Number of family members living in abroad
Number of ncm living in cities	Number of family members living in city

Table 4: Summary statistics

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Retirement	0.494	(0.5)	0	1	2565
Inter-household transfer	59.01	(283.166)	0	5499.962	2565
Pension	35.558	(119.663)	0	991.826	2565
Head	0.481	(0.5)	0	1	2565
Sex	0.628	(0.483)	0	1	2565
Age	65.939	(6.449)	55	80	2565
Age squared	4389.495	(861.847)	3025	6400	2565
Marital status	0.706	(0.456)	0	1	2565
Co-residing spouse	0.686	(0.464)	0	1	2565
Educational achievement	0.898	(0.77)	0	3	2565
Poor health	0.071	(0.256)	0	1	2565
Transfers out	0.074	(0.263)	0	1	2565
Household size	4.669	(2.126)	2	19	2565
Number of old (> 80)	0.059	(0.251)	0	2	2565
Number of young(< 10)	0.538	(0.908)	0	5	2565
Number of unemployment	0.273	(0.609)	0	5	2565
Average education of others	0.994	(0.867)	0	3	2565
Sharing house with other households	0.913	(0.282)	0	1	2565
Value of durables	697.298	(1211.706)	1.528	18442.441	2565
Regions	5.544	(2.975)	1	10	2565
Income quintiles	3.387	(1.341)	1	5	2565
Number of non-coresiding members(ncm)	4.148	(2.131)	1	12	2565
Average age of ncm	34.505	(6.108)	4	61.5	2565
Average education achievement of ncm	1.72	(1.05)	0	3	2565
Number of ncm living abroad	0.094	(0.433)	0	5	2565
Number of ncm living in cities	0.861	(1.53)	0	12	2565

This result indicates that inter-household transfers are not exogenously determined. Hence, there are some interactions between retirement choice and inter-household transfers. Therefore, it is necessary to control for endogeneity of inter-household transfers when estimating the effects of public and inter-household transfers on retirement choice.

Retirement Choice

Table 5: Probit Estimates of Retirement: Marginal Effects

	Probit		IVProbit	
	Coef.	<i>p</i> -value	Coef.	<i>p</i> -value
Inter-household transfer	.00014	.01466	.00132	.00625
Pension	.00029	.00373	.00067	.01004
Head (d)	-.14092	.00000	-.37804	.00000
Sex (d)	.00500	.87311	.00008	.99921
Age	-.00320	.92971	-.01115	.90444
Age squared	.00023	.40148	.00059	.39393
Marital status (d)	-.04204	.62575	-.21352	.34958
Co-residing spouse (d)	-.22404	.00500	-.47497	.03349
Educational achievement	.00409	.79648	.01512	.70999
Poor health (d)	.09139	.03253	.11777	.34663
Transfers out (d)	-.13791	.00144	-.40087	.00074
Household size	.04019	.00000	.10121	.00000
Number of old (>80)	-.07070	.14313	-.18793	.12899
Number of young(<10)	-.01479	.37617	-.03844	.36775
Average education of others	.01280	.41729	.04137	.30918
Sharing house with other households (d)	-.07115	.07791	-.19504	.06638
Value of durables	.00007	.00000	.00012	.00288
Urban area (d)	.35566	.00000	.90066	.00000
-				
No. of observations	2565		2565	

Source: Vietnam Living Standard Survey 1998

I estimate the model of retirement choice with two methods. First, I estimate the retirement choice model with standard probit estimation method, treating inter-household transfers as an exogenous variable. Then, I estimate the retirement choice model with IV probit estimation method, treating inter-household transfer as an endogenous variable. The estimation results are reported in table 5. The estimates of marginal effects and *p*-values of the former are reported in columns 2 and 3, respectively. The estimates of marginal effects and *p*-values of the later are reported in column 4 and 5, respectively.

The estimates of inter-household transfers and public transfers are positive and highly significant under both approaches. The positive signs of coefficients of pension and inter-household transfer variables are consistent with the crowding-out hypothesis. Precisely, it

indicates that the more transfers received by the elderly from either public or private sources the more likely the elderly will withdraw from the labor force.

Interestingly, the magnitudes of the estimates are substantially different. The estimate of inter-household transfers using the IV probit method is almost 10 times larger than that using standard probit method. Similarly, the estimate of the pension effect is at least twice as large as that used standard probit estimation method. This result is consistent with the hypothesis that the dynamics of private transfers and labor supply of the elderly play a role in magnifying the crowding-out effect of public transfers on labor supply. My result implies that when not controlling for endogeneity of inter-household transfers, which is caused by these interactions between inter-household transfers received and labor supplied by the elderly, the effects of both public and private transfers are significantly under-estimated.

The coefficients of public and private transfers are not the same as seen in theoretical models. This indicates that the motives for private transfers are not purely altruistic. Perhaps surprisingly, inter-household transfers have more influence on retirement decisions than public pensions do. The coefficients of inter-household transfers is at least twice as big as that of public transfers. The estimates imply that an additional 100 US dollar increase (roughly a quarter of GDP per capita in the same year) in private transfers per year increases the retirement probability by 13% while the exact same increase in public pension only increases the probability by 7%.

Some of demographic characteristics of the elderly play a role in determining the retirement choice. The elderly who are the head of a household tend to have a longer work life. The elderly whose spouse is alive and coresident are more likely to work. Health status is one of determinants of retirement choice. The elderly with bad health conditions tend to drop out of the labor force earlier. Human capital seems not to be a key determinant of retirement choice in old ages as the estimate of the variable of educational achievement is positive but not significant.

The estimation results indicate that other characteristics of household including the household size, household human capital, housing condition, value of durables, and living areas are also influencing factors of the elderly's retirement choice. The elderly in the household of bigger size, fewer dependents and higher human capital are more likely to retire. Housing condition and the value of durables as proxies for asset holdings are important predictors of the retirement choice. The elderly who have to share a house with other households tend to retire late. The values of durables is also positively and significantly correlated to the probability to retire.

The elderly living in urban areas, which are higher income areas, are more likely to withdraw from the labor force earlier than the elderly living in rural areas. Hence, the individuals living in a household with a better profile are more likely to afford retirement when old. This result implies that in addition to intra-family transfers, which are unobservable but could be inferred from characteristics of other household members, play important role in determining the elderly's retirement choice.

7 Conclusion

In this paper I investigate the role of the interactions between private transfers received and labor supplied by the elderly in analyzing the effects of public transfers in the context of developing countries. First, I show that these interactions alter the opportunity cost of retirement, which then magnify the crowding-out effects of public transfers. This result has an implication for evaluating the effects of public transfers in developing countries. It is necessary to control for the endogeneity of private transfers, which results from the interactions between private transfers and labor choice of the elderly. Otherwise, it under-estimates the crowding-out effects. Then, using the data from Vietnam Living Standard Survey 1998, I find that the effects of public transfers is substantially under-estimated when not controlling for the endogeneity of inter-household transfers. In addition, I find the evidence supporting the hypothesis that public transfers crowd-out labor supply of the elderly.

The paper has focused on the retirement choice of the elderly. An extension is to estimate the crowding-out effects of public transfers on hours worked.

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