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Assessing the Impacts of Food and Non-Food Grants on Poverty Alleviation in the Philippines: The Case of Pasay City[1]

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Abstract: There is ongoing debate as to the effectiveness of food grant versus a non-food grant. This study aims to determine the programme that is more effective in addressing welfare issues such as health, nutrition, and education of the family members who are most vulnerable to economic shocks in Pasay city. Two programmes were compared and evaluated namely food grant and the non-food grant as represented by various programmes. The effects of these programmes on the target of enhancing retention rate through active school participation are determined using the Generalised Method of Moments (GMM). On the other hand, the effects of these programmes on the target of reducing the probability that a household will experience state hunger are determined using Maximum Likelihood Estimation (MLE). The statistical significance of the estimates allows this study to determine the effectiveness of such programmes as well as to verify which between the food grant and non-food grant is better in alleviating the state of poverty. Results showed that non-food programmes are more effective than a food programme based on the regressions for Pasay City.

Keywords: Food grant, generalised method of moments, maximum likelihood estimation, non-food grant, Pasay city, poverty, welfare
JEL classification: D130, D610, I310, O120, O150

1. Introduction

The incidence of hunger in the Philippines and the Arroyo administration's intensified efforts to address hunger among school children and their families gave rise to hunger mitigation projects in November 2005, one of which is the Food-for-School Program (FSP). The FSP is a conditional food transfer programme providing a kilo of rice to families who suffer from severe hunger through their children in day care centres, preschools, and in Grade 1 public schools operated by the Department of Education (DepEd). Furthermore, the FSP beneficiary-families that ensure the regular attendance of their children in public schools and state-run day-care centres are entitled to a free kilogram of rice from the National Food Authority (NFA) for each of the 13 days covered by the programme (Ordinario 2009). Hence, its major goal is to help feed the poorest families, and help them cope with higher fuel and food prices, and educate their children.

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Under the FSP, there is increased investment on children's human capital through school attendance, regular use of preventive health care, and nutrition service but it can also involve changes in other aspects of their behaviour (Manasan and Cuenca 2007). According to De Janvry and Sadoulet (2005), the FSP is running on an assumption that the income effect of an unconditional transfer is insufficient to stimulate demand for investment in human capital. To address this, there is a need for conditions to boost demand for education and child/maternal health services, which work best when the supply of these basic social services is strong (Manasan and Cuenca 2007).

The budget allocation of the Philippines for the FSP has been increasing since its implementation. As reported in Manasan and Cuenca (2007), the total budget allocation of the FSP was PHP 2.9 billion and PHP 5.098 billion in 2006 and 2007 respectively. The beneficiaries of the FSP are the pre-school and Grade 1 students in all public elementary schools in the National Capital Region (NCR), Divisions of Sulu and Tawi-Tawi in the Autonomous Region for Moslem Mindanao (ARMM), and within selected public elementary schools in the 49 provinces classified according to severity of food insecurity and vulnerability to hunger, as indicated in the Food Insecurity and Vulnerability Information Mapping System (FIVIMS).

According to the National Antipoverty Commission (NAPC) as cited in Ordinario (2009), approximately 1.04 million poor Filipino families were able to benefit from the government's massive school-feeding programmes at the height of the oil and rice crises in 2008. Moreover, according to Manasan and Cuenca (2007), there is a growing interest on these instruments worldwide owing to evidence that they have not only been useful in providing assistance to poor families but more so because they have been found to be effective in securing investments in human capital among the poor.

On the other hand, the World Bank (WB), as cited in Ordinario (2009), claimed that FSPs are effective only a third of the time and it is among the social-welfare programmes of the government that are not well-targeted and should be scrapped. To counter such claims, the NAPC states that the government had already accomplished 90 per cent of its targeted distribution under the first phase of the FSP for the academic year (AY) 2008 to 2009. Similarly, a report by the DepEd also indicated that the FSP helped in improving school attendance among students in public elementary schools to 95 per cent in 2007 from 90 per cent in 2006. Another report said that levels of malnutrition among the same set of students, meanwhile, declined to 17 per cent during the period from 21 per cent in 2006. According to Presse (2008), this is of interest to track since malnourishment or hunger hampers the child from participating in classroom activities, resulting in a slow learning rate.

In most cases, literature relating to school feeding programmes shows that it has a huge potential in contributing to education improvement. The food grant could respond to the priority needs of the poor and is also known to be efficient because it is self-selecting. However, Standing (2008) points out several reasons why it may not work. First, a food grant may not be what the vulnerable really need at the moment. Second, it is potentially market distorting (i.e. reduced incentives for local farmers) which in the long run can adversely affect employment and local livelihoods. Finally, it often fails to target those who are really vulnerable to hunger and poverty due to inaccessibility. The cost involved to monitor that the targeted beneficiaries are reached is also another limitation. Because of this, another

alternative could be conditional cash transfers, which is monetary aid that can be used for productive purposes (i.e. education).

Given such a backdrop, the following are the key questions in this research. First, which between the food grant and non-food grant programmes of the government has a greater impact in raising the welfare of the poor? Second, how effective and efficient is the provision of food grant and non-food grant in the Philippines? Note that to assess effectiveness of these programmes, the following questions must be evaluated: First, did the school retention rate improve? Second, did the school participation rate increase? Given these key questions, the objectives of this study are as follows:

- To identify what is currently known about the constraints in the implementation of poverty alleviation programmes of the government by conducting a critical review of the most widely cited literature and undertaking an analysis of the relevant issues using recently available and nationally representative datasets such as the Community Based Monitoring System (CBMS) survey.
- To show that one grant is superior to the other in enhancing the welfare of the poor theoretically and empirically;
- To identify the facets that will contribute to increasing school participation and reducing the state of hunger of households by implementing an empirical framework incorporating the various government-sponsored programmes to alleviate poverty.
- To determine the significant government programmes that can increase school participation and reduce state of hunger through the use of the CBMS household survey. A household is used as a unit of analysis because it maximises collective utility, which can come from higher school participation and lower incidence of hunger.

The major policy relevance and implications of the results of the study should give direction as to the most effective programme to address the problem of the incidence of hunger and absenteeism. On the implications of expenditure targeting and tracking, this will be of interest to policy makers because the government, local government units (LGUs), non-government organisations (NGOs), the community, and other stakeholders, through the advocacy programme, will be motivated to undertake measures to mitigate the incidence of hunger among Filipino households especially school-age children. Note that schools with communities behind them are more effective than schools with less community involvement. Finally, the government can initiate long-term programmes that would include a package of incentives and evaluation to further reduce the effect of hunger incidence on investment in human capital in general. Such undertakings will motivate parents to send their children to school and have them attend regularly if the FSP is found to be effective in reducing absenteeism and improving the duration of schooling and educational outcomes such as academic performance and reduced dropouts.

2. The Food-for-School Program (FSP) and the Conditional Cash Transfer Programme

2.1. Incidence of Hunger and Malnutrition and the FSP

Hunger is a severe state of food insecurity that causes a throbbing sensation due to the inadequacy of food intake. Prolonged hunger leads to malnutrition. According to the 6th

Table 1. Incidence of hunger in the Philippines

Severity of hunger/ area	2005		2006				2007
	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr
Severe hunger	2.6	3.9	4.2	3.4	4.6	3.9	4.0
No of families	400,000	600,000	700,000	580,000	800,000	670,000	696,000
Moderate hunger	**-**	**-**	12.7	10.1	12.3	15.1	15.0
No of families	-	-	2,209,000	1,757,000	2,140,000	2,597,000	2,580,000
Total hunger incidence	**15.5**	**16.7**	**16.9**	**13.9**	**16.9**	**19.0**	**19.0**
National Capital Region	16.7	21.0	18.3	15.0	12.8	17.7	20.7
Luzon	18.0	13.7	14.7	10.0	14.7	17.7	18.3
Visayas	13.3	14.3	16.0	17.7	19.7	19.0	15.3
Mindanao	12.0	21.7	21.0	17.3	21.3	22.3	22.7

Source: Social Weather Stations (SWS); Department of Education (DepEd)

National Nutrition Survey (NNS), in 2005, 27 out of 100 children in the age group 6 to 10 years were underweight for their age, and 36 out of 100 children in the same age group were short for their age. Hence, malnutrition does persist among Filipino children.

Moreover, according the first quarter of the 2007 Self-Rated Hunger Survey of the Social Weather Station (SWS), as seen in Table 1, 19 per cent of Filipino households experienced hunger, with nothing to eat, at least once in the previous 3 months. Results revealed that hunger was highest in Mindanao with 22.7 per cent followed by the NCR, Luzon, and Visayas with 20.7 per cent, 18.3 per cent, and 15.3 per cent respectively. Moreover, relative to the fourth quarter of 2005, the incidence of severe hunger, wherein families experienced hunger often or always in the last 3 months, increased from 3.9 per cent to 4.0 per cent affecting approximately 700,000 families.

Also, estimates from the 2003 Family Income and Expenditure Survey (FIES) conducted by the National Statistics Office (NSO) revealed a 10.2 per cent subsistence incidence among Filipino households or 2.3 million households have incomes below the annual per capita food threshold of PHP 8,149.00. Moreover, the survey also showed that the subsistence incidence was at double digits for households with 6 or more members as seen in Table 2.

The root causes of hunger are deemed to be the unavailability or insufficiency of food to eat, and insufficiency of income or money to buy food. Hence, there is a need to implement hunger-mitigating measures since malnutrition and poor school performance are the top factors influencing the primary educational system's dropout rate (Presse 2008). According to the Department of Education [DepEd] (2006), to address the issue of hunger, there is a need to produce more food and ensure efficient logistics and food delivery to whom and where it is needed. There is also a need to increase the purchasing power of people in order to diversify their diets and manage their poverty levels. However, such measures will take time, hence, the FSP was established, which is an immediate intervention measure to address hunger among families through their children in day care centres, pre-schools, and Grade 1. The FSP provides food subsidy for young learners who belong to impoverished households by rationing 1 kilo of rice provided that the child goes to school. Thus, the FSP, aside from mitigating hunger among poor families, also aims to contribute to the improvement of the nutritional status and school retention rates of children.

Table 2. Subsistence incidence by household size – 2003

Household size	Total number of households (in '000)	Subsistence poor (Food – Poor)	
		Number of households (in '000)	Incidence
All households	16,480	1,671	10.1
1	689	9	1.3
2	1,636	38	2.3
3	2,651	95	3.6
4	3,320	186	5.6
5	3,018	287	9.5
6	2,163	320	14.8
7	1,397	285	20.4
8	779	197	25.3
9	428	131	30.6
>10	399	121	30.3

Source: National Statistical Coordination Board (NSCB); 2003 Family Income and Expenditure Survey (FIES); National Statistics Office (NSO); Department of Education (DepEd), (2007)

2.2. Goals of the FSP: Improve Educational Quality and Efficiency

According to Del Rosso (1999), nutritional and health status has a dominant influence on a child's learning and performance level in school. Children who experience hunger and who lack the necessary nutrients in their diet do not have the same potential for learning as healthy and well-nourished children. Weak health and poor nutrition among school-age children diminish their cognitive development either through physiological changes and/or by reducing their ability to participate in learning experiences.

Del Rosso (1999) further stated that poor nutrition and health among schoolchildren contributes to the inefficiency of the educational system. Children with lower cognitive abilities and sensory impairments naturally perform less well and are more likely to repeat grades and to drop out of school than children who are not impaired; they also enrol in school at a later age, if at all, and finish fewer years of schooling. The irregular school attendance of malnourished and unhealthy children is one of the key factors for poor performance. Even temporary hunger, common in children who are not fed before going to school, can have an adverse effect on learning. Children who are hungry have more difficulty concentrating and performing complex tasks, even if otherwise well nourished. Research and programme experience shows that improving nutrition and health can lead to better performance, fewer repeated grades and reduced drop outs.

2.2.1. Alleviate Short-Term Hunger and Improve Cognition

The number of hungry school-age children is uncertain but is likely to be a significant problem in various circumstances. Many factors contribute to hunger in schoolchildren such as the long distances children have to travel to school and lack of family resources to provide adequate meals to children. Simply alleviating this hunger in schoolchildren helps them to perform better in school. For instance, according to Simeon and Grantham-McGregor (1989), in Jamaica, providing breakfast to primary school students significantly increased attendance and arithmetic scores and it was observed that the children who benefited most were those who were wasted, stunted, or previously malnourished.

Moreover, according to Meyers *et al.* (1989), the benefits of providing breakfast to disadvantaged primary school students are significant. Before the start of a school breakfast programme, eligible low-income children scored significantly lower on achievement tests than those not eligible. Once in the programme, the test scores of the children participating in the programme improved more than the scores of non-participants; the attendance of participating children also improved.

2.2.2. Increase Enrolments and Improve Attendance

Children in poor health start school later in life or not at all (Del Rosso 1999). A study in Nepal by Moock and Leslie (1986) as cited by Del Rosso (1999) found that the probability of attending school was 5 per cent for stunted children versus 27 per cent for children of normal nutritional status. Moreover, in Ghana, a study by Glewwe and Jacoby (1994) as cited in Del Rosso (1999) showed that malnourished children entered school at a later age and completed fewer years of school than better nourished children. Thus, Del Rosso (1999) emphasised that the number of days that a child attends school is related to cognition and performance and FSPs can have a positive effect on rates of enrolment and attendance.

A World Food Programme (WFP) study conducted in Malawi in 1996 revealed that over a three-month period of a feeding programme, there was a 5 per cent increase in enrolment and up to 36 per cent improvement in attendance relative to control schools over the same period. Similarly, Ahmed and Billah (1994) as cited in Del Rosso (1999) revealed that a programme of school-based food distribution in Bangladesh increased enrolment by 20 per cent against a 2 per cent decline in non-participating schools.

2.2.3. Promote Community Participation

Schools that depend on the community as well as LGUs and NGOs to organise and implement the FSP offer a wide range of advantages. Del Rosso (1999) enumerated these advantages namely: (i) increasing communication between parents and teachers, officials and others; (ii) giving parents the opportunity to become more aware of what goes on at schools; and (iii) raising the value of education and the school for parents and the whole community. For instance, according to the WFP, school canteens are an important feature of education policy in Morocco. Since 1978, the WFP and the government have supported school feeding. The programmes have strong government and community support and are viewed as a necessary package of inputs for improving education. The feeding programme is credited with helping to maintain high enrolment and attendance and encouraging community participation in education.

2.3. The Conditional Cash Transfer (CCT) Programme

In the Philippines, the Department of Social Welfare Development [DSWD] (2012) is the government office tasked with implementing and monitoring the conditional cash transfer programme. This programme is locally known as the '*Pantawid Pamilyang Pilipino'* Programme and is a cornerstone of the country's efforts in addressing welfare related problems brought about by the global financial crisis. The cash transfer programme is aimed at providing assistance to extremely poor households to improve their health, nutrition, and education particularly children aged 0 to 14.

According to the DSWD, the selection process is done through the National Household Targeting System for Poverty Reduction using the proxy means test which determines the socio-economic category of the families by evaluating certain proxy variables such as ownership of assets, housing type, household head's education, family's livelihood and access to water and sanitation facilities. Moreover, DSWD accentuated that beneficiaries must comply with the following conditions: pregnant women must avail pre- and post-natal care and be attended by a trained health professional during childbirth; parents must attend Family Development Sessions; 0 to 5-year-old children must receive regular preventive health check-ups and vaccines; 3 to 5-year-old children must attend day care or pre-school classes at least 85 per cent of the time; 6 to 14-year-old children must enroll in elementary or high school and must attend at least 85 per cent of the time; and 6 to 14-year-old children must receive de-worming pills twice a year.

The Asian Development Bank (ADB) approved a USD400 million loan in September 2010 to support the expansion of the programme which operates in 80 provinces, 734 municipalities and 62 key cities in the country. Moreover, according to Esguerra (2011), 1.6 million Filipino households were given a total of PHP 4 billion under the *Pantawid Pamilyang Pilipino* Programme under the facilitation of the DSWD. Esguerra (2011) reported that this amount is part of the 88 per cent of the funds given to the DSWD. As such, the total funds of the government allocation for the conditional cash transfer (CCT) will reach PHP 21 billion. According to DSWD as reported by Esguerra (2011), the beneficiaries of the CCT are the poor characterised by a very large family size.

2.4. The Role of Socio-Economic-Demographic Factors

2.4.1. The Human Capital Theory

The human capital theory views education as a form of investment where individuals compare the direct, indirect, psychic, and opportunity costs of education with the future benefits of education. Individuals continue to invest in education until its marginal benefits are equal to its marginal costs (Schultz 1960). A key characteristic of this theory is Adam Smith's notion that investment in education and skills formation is a significant factor in economic growth, just as in the case of investments in physical plants and equipments. Furthermore, Becker (1965), Becker and Lewis (1973) and Todaro and Smith (2006) deemed that investment in knowledge, skills, and health will not only benefit the individual, but can also increase an employer's or country's human capital resource pool and potential productivity.

Moreover, the theory corresponds to the decisions of a household in evaluating the determinants of investment in schooling. Becker and Tomes (1993) proposed that the household head makes decisions regarding the proper allocation of the family's economic resources. The allocation of family resources to the children is affected by the nature of these resources as well as the timing of their distribution. Thus, altruistic parents maximise household utility with respect to the number of children, the quality of children, a composite consumption good, and the leisure of household members, which is subjected to income and time constraints for the household members. Optimisation results in a set of reduced form household demand function for the number of children, children's education, the consumption good, leisure, as well as the derived demand function for the market goods and labour force participation.

Consequently, the demand for children's education can be represented as a function of household income, market prices of inputs, unearned household income, and a set of child, household, and community characteristics. It is assumed that parents are altruistic and that an imperfect capital market exists. As a result, this situation produces causal relationships between prices, income and an individual's school participation. Since education is assumed to be a normal good, higher income and wealth will increase school participation holding other factors constant. Likewise, if schooling is deemed to be an investment good, a positive relation will still exist between schooling and income under an imperfect capital market scenario, since higher income households are able to send their children to school. However, the largest part of education cost is the opportunity cost of children's time that can be spent by being part of the labour force instead of being in school (Haveman and Wolfe 1984).

2.4.2. Income and Employment as Determinants of School Participation

Studies that explain why an individual enters school through analysing the impact of various factors affecting school participation and educational attainment have been considered essential in justifying Adam Smith's view that education is as important as investments in physical plants and equipment in promoting growth and development for the entire economy. These studies can be categorised into three groups namely the transfer of education across generations, the family characteristics to which an individual belongs, and the characteristics of the individual's society and environment (Borromeo *et al.* 2007).

Estimation on demand for education has been influenced by domestic factors including employability, domestic economic progress, rate of return, and availability of credit. Income has been a significant determinant based on the study of Hauser and Daymont (1977) that looked at how the financial capability of households affects the demand for education or school participation of children in a household. They observed that each dollar of parental income is positively related to educational demand. Tullao and Rivera (2008) verified this result and was able to observe that income and relative prices are deemed to be important determinants in the estimated demand equations for basic education**.** Furthermore, Björklund *et al.* (2004) concluded that a two-parent household is expected to have high household income while a single-parent household is associated with low household income since only one parent is providing for all the needs of the children.

More importantly, family characteristics are also significant factors affecting school participation and demand for education. These include school attendance and eventual educational attainment of children in the family (Borromeo *et al.* 2007). Family structures are also considered to be determinants of education as Biblarz and Raftery (1999) show that the education of the parents in a family is positively associated with their children's educational attainment. Agreeing with these findings are Lillard and Willis (1994) and Binder and Woodruff (1999), who also found that students whose heads of the family do not belong to the labour force report reduced educational attainment. These results imply that students will demand education based on their parental achievements, societal status, and family size.

Another underlying theory behind the demand for education is the Blau and Duncan Model of Social Attainment cited by Haller and Portes (1973). It hypothesises that educational and occupational status is transferred among succeeding generations, from the parents to their children, through the status attainment process. Likewise, it also hypothesises that parental positions exert a significant and positive effect on the eventual schooling that is

achieved by their children (Haller and Portes 1973). This is augmented by the Wisconsin Model stating that the socio-economic status of the family affects children's educational and eventual occupational attainment. Undeniably, households that are economically privileged are more likely to have higher school participation compared with financially-constrained families who have to prioritise their demand for basic needs such as food, clothing, and shelter before investing in education (Chevalier and Lanot 2001).

3. Framework of the Study

3.1. Theoretical Framework

In order to prove which programme is more effective and efficient in targeting the beneficiaries, the following framework will be used. Note that the FSP was phased out by the government due to its ineffectiveness. Instead, the government resorted to non-food grants. As such, there is a need to show that a non-food grant is superior to a food grant.

To show why a non-food grant is superior to a food grant in raising the welfare of the poor, we need to show first the welfare of a household without any subsidy from the government.

Let X be the food consumption of a poor household. Let Y be the other consumption goods of a poor household. This may include consumption or spending on clothing, shelter, medical, and education. Let Z be the income or budget of the poor household. Moreover, a poor household also has a corresponding utility function denoted by $U = U(X, Y)$. The poor household's budget constraint is denoted by $Z = P_1X + P_2Y$ where P_1 is the price of food and P_2 is the price of other goods. Hence, we have a utility maximisation problem.

Further assume that a poor household has a Cobb-Douglas utility function denoted by $U = U(X, Y) = AX^{\alpha}Y^{\beta}$, where $A \in \Re$, $A = 1$, $\alpha + \beta = 1$, and $\alpha < \beta$ indicating that $X \pi Y$.
Thus,

$$\max U_{x,y} = X^{\alpha}Y^{\beta} \text{ subject to } Z = P_1X + P_2Y \quad (1)$$

$$L = X^{\alpha}Y^{\beta} + \lambda (Z - P_1X - P_2Y) \quad (2)$$

Solving for the First Order Conditions (FOCs),

$$\frac{\partial L}{\partial X} = \alpha X^{\alpha-1}Y^{\beta} - \lambda P_1 = 0 \quad (3)$$

$$\frac{\partial L}{\partial Y} = \alpha X^{\alpha}Y^{\beta-1} - \lambda P_2 = 0 \quad (4)$$

$$\frac{\partial L}{\partial \lambda} = Z - P_1X - P_2Y = 0 \quad (5)$$

Solving for λ in Equations (3) and (4)

$$\lambda = \frac{\alpha X^{\alpha-1}Y^{\beta}}{P_1} \quad (6)$$

$$\lambda = \frac{\beta X^{\alpha}Y^{\beta-1}}{P_2} \quad (7)$$

Equating (6) and (7) to solve for the marginal rate of substitution between X and Y (MRS_{XY}) as well as the price ratio,

$$\frac{\alpha X^{\alpha-1}Y^{\beta}}{\beta X^{\alpha}Y^{\beta-1}} = \frac{P_1}{P_2} \tag{8}$$

Simplifying equation (8),

$$\frac{\alpha Y}{\beta X} = \frac{P_1}{P_2} \tag{9}$$

Solving for Y in equation(9),

$$Y = \frac{\beta P_1 X}{\alpha P_2} \tag{10}$$

Substituting Equation (10) for equation (5) and simplifying will solve for optimal consumption of X.

$$\begin{aligned} Z - P_1X - P_2\left(\frac{\beta P_1 X}{\alpha P_2}\right) &= 0 \\ Z - P_1X - \left(\frac{\beta}{\alpha}\right)P_1X &= 0 \\ Z = P_1X + \left(\frac{\beta}{\alpha}\right)P_1X & \qquad (11) \\ Z = X\left[P_1 + \left(\frac{\beta}{\alpha}\right)P_1\right] & \\ X = \frac{Z}{\left(\frac{\alpha P_1 + \beta P_1}{\alpha}\right)} & \\ X^* = \frac{\alpha Z}{\alpha P_1 + \beta P_1} & \end{aligned}$$

Substituting equation (11) for equation (10) will solve for optimal consumption of Y.

$$\begin{aligned} Y &= \frac{\beta P_1}{\alpha P_2} \cdot \frac{\alpha Z}{P_1(\alpha+\beta)} \\ Y^* &= \frac{\beta Z}{\alpha P_2 + \beta P_2} \end{aligned} \tag{12}$$

Substituting equations (11) and (12) to $U = U(X, Y) = X^{\alpha}Y^{\beta}$ will yield the indirect utility function or the maximum utility derived from consuming optimal values of X and Y.

$$\begin{aligned} U^* &= \left(\frac{\alpha Z}{\alpha P_1 + \beta P_1}\right)^{\alpha}\left(\frac{\beta Z}{\alpha P_2 + \beta P_2}\right)^{\beta} \\ U^* &= \left(\frac{\alpha}{\alpha P_1 + \beta P_1}\right)^{\alpha}\left(\frac{\beta}{\alpha P_2 + \beta P_2}\right)^{\beta} Z, \text{ since } a + b = 1 \end{aligned} \tag{13}$$

Suppose the government engages in the provision of a food grant such that the poor households receive a certain amount of $X = \omega$. Moreover, the introduction of a food grant will allow the poor household to spend all household income on all other goods, Y, but still

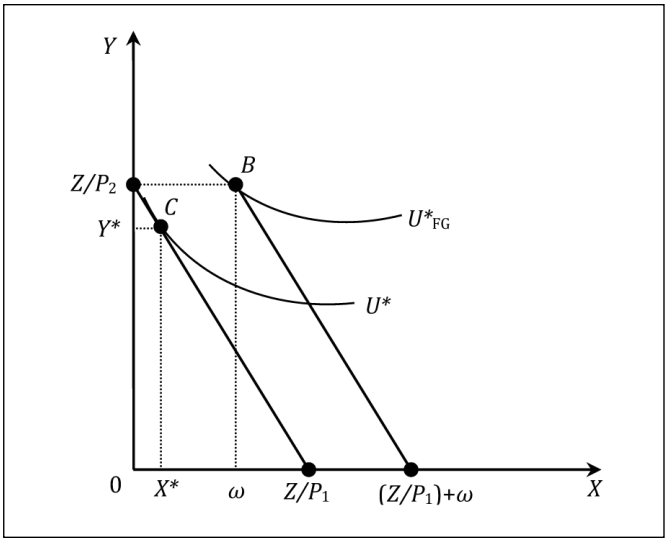

Figure 1. The provision of food grant

allowing for the consumption of X through the food grant, ω. Graph 1 shows the level of utility with and without the food grant. Point C shows the optimal consumption point if there is no food grant as shown by equations (11), (12), and (13). Meanwhile, Point B shows the optimal consumption of X and Y if a food grant was provided. Since the poor household will no longer spend on X due to ω, an increase in the consumption of Y will occur since the poor household will now spend all income on Y.

Hence, it can be seen that the food grant will be able to increase the utility level of the poor household since it is able to increase its consumption of X and Y. However, this is only true if $X < \omega$. On the other hand, if $X > \omega$, then we have equation 14.

Therefore, upon the introduction of food grant, the amount of Y can be given as:

$$Y = \frac{Z}{P_2} \; if \; 0 < X < \omega \; or \; Y = \frac{Z}{P_2} - \frac{P_1(X-\omega)}{P_2} \text{ if } X > \omega \tag{14}$$

Hence, the maximum utility level given a food grant, $U^*_{FG} = \omega^{\alpha}(Z/P_2)^{\beta}$, can be achieved when $X^*_{FG} = \omega$ and $Y^*_{FG} = Z/P_2$.

Suppose that the government, instead of providing a food grant, offered a non-food grant. The non-food grant is equal to the price of X times the number of food grant that the government is supposed to provide. Therefore, the new budget constraint is now:

$$Z + P_1\omega = P_1X + P_2Y \tag{15}$$

Thus, the new utility maximisation problem is given by:

$$max U_{x,y} = X^{\alpha}Y^{\beta} \; subject \; to \; Z + P_1\omega = P_1X + P_2Y \tag{16}$$

$$L = X^{\alpha}Y^{\beta} + \lambda(Z + P_1\omega - P_1X - P_2Y) \tag{17}$$

Solving for FOCs,

$$\frac{\partial L}{\partial X} = \alpha X^{\alpha-1} Y^{\beta} - \lambda P_1 = 0 \tag{18}$$

$$\frac{\partial L}{\partial Y} = \alpha X^{\alpha} Y^{\beta-1} - \lambda P_2 = 0 \tag{19}$$

$$\frac{\partial L}{\partial \lambda} = Z + P_1 \omega - P_1 X - P_2 Y = 0 \tag{20}$$

Solving for λ in (18) and (19)

$$\lambda = \frac{\alpha X^{\alpha-1} Y^{\beta}}{P_1} \tag{21}$$

$$\lambda = \frac{\beta X^{\alpha} Y^{\beta-1}}{P_2} \tag{22}$$

Equating (21) and (22) to solve for the MRS_{XY} as well as the price ratio,

$$\frac{\alpha X^{\alpha-1} Y^{\beta}}{\beta X^{\alpha} Y^{\beta-1}} = \frac{P_1}{P_2} \tag{23}$$

Simplifying Equation (23),

$$\frac{\alpha Y}{\beta X} = \frac{P_1}{P_2} \tag{24}$$

Solving for *Y* in Equation (24),

$$Y = \frac{\beta P_1 X}{\alpha P_2} \tag{25}$$

Substituting equation (25) into equation (20) and simplifying will solve for optimal consumption of *X* given a non-food grant.

$$Z + P_1 \omega - P_1 X - P_2 \left(\frac{\beta P_1 X}{\alpha P_2}\right) = 0$$

$$Z + P_1 \omega - P_1 X - \left(\frac{\beta}{\alpha}\right) P_1 X = 0$$

$$Z + P_1 \omega = P_1 X + \left(\frac{\beta}{\alpha}\right) P_1 X$$

$$Z + P_1 \omega = X\left[P_1 + \left(\frac{\beta}{\alpha}\right) P_1\right] \tag{26}$$

$$X = \frac{Z + P_1 \omega}{\left(\frac{\alpha P_1 + \beta P_1}{\alpha}\right)}$$

$$X^*_{CG} = \frac{\alpha (Z + P_1 \omega)}{\alpha P_1 + \beta P_1}$$

Substituting equation (26) into equation (25) will solve for optimal consumption of *Y*.

$$Y = \frac{\beta P_1}{\alpha P_2} \cdot \frac{\alpha(Z+P_1\omega)}{P_1(\alpha+\beta)}$$
$$Y^*_{CG} = \frac{\beta(Z+P_1\omega)}{\alpha P_2+\beta P_2} \quad (27)$$

Substituting equations (26) and (27) to $U = U(X, Y) = X^{\alpha}Y^{\beta}$ will yield the indirect utility function or the maximum utility derived from consuming optimal values of *X* and *Y* given a non-food grant.

$$U^*_{CG} = \left(\frac{\alpha Z+\alpha P_1\omega}{\alpha P_1+\beta P_1}\right)^{\alpha}\left(\frac{\beta Z+\beta P_1\omega}{\alpha P_2+\beta P_2}\right)^{\beta}$$
$$U^*_{CG} = \left(\frac{\alpha}{\alpha P_1+\beta P_1}\right)^{\alpha}\left(\frac{\beta}{\alpha P_2+\beta P_2}\right)^{\beta}(Z+P_1\omega) \; since\; \alpha+\beta=1 \quad (28)$$

Graph 2 shows the difference in utility derived by a poor household if there is no government subsidy, if there is food grant, and if there is non-food grant. It can be seen that a non-food grant is superior to a food grant because poor households can derive a higher utility level from the non-food grant. This is because we can find a higher utility level than U^*_{FG}.

Comparing the utility levels without any government transfer with a food grant and a non-food grant reveals that indeed, the utility of poor household is higher if a non-food grant is provided.

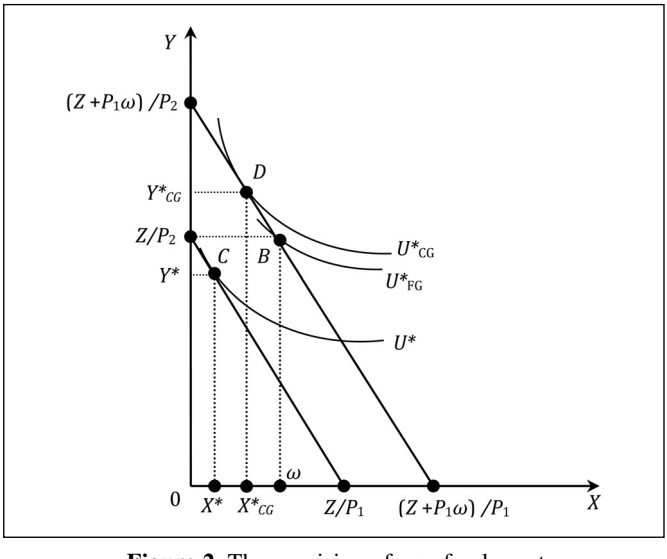

Figure 2. The provision of non-food grant

No Transfer	Food Grant	Non-food grant
$U^* = \left(\frac{\alpha Z}{\alpha P_1 + \beta P_1}\right)^{\alpha} \left(\frac{\beta Z}{\alpha P_2 + \beta P_2}\right)^{\beta}$	$<\ U^*_{FG} = \omega^{\alpha} \left(\frac{Z}{P_2}\right)^{\beta}$	$<\ U^*_{CG} = \left(\frac{\alpha Z + \alpha P_1 \omega}{\alpha P_1 + \beta P_1}\right)^{\alpha} \left(\frac{\beta Z + \beta P_1 \omega}{\alpha P_2 + \beta P_2}\right)^{\beta}$

The government usually provides poor households with non-food grants in place of food grants due to the foreseeable returns of such transfers. The difference in utility derived by households with respect to these transfers can be attributed to the nature of such transfers.

A food grant provides a household with consumable goods that can temporarily spare them from the state of hunger. This means that after consuming the food grant, the recipient households are still bound to revert to the previous condition of a low standard of living. This is because food alone cannot provide multiplicative returns because it is a purely consumption good, unless the households sell it.

On the other hand, a cash transfer can subsume all the benefits of a food grant and even yield higher returns for the household in the future because a non-food grant is both a consumption and investment tool. A recipient household can make use of the non-food grant in two ways. First, a poor household can use the non-food grant to buy food, which will result in the same effect of a food grant. In fact, it can even use it for or a variety of expenditures such as utilities, education, and medical expenses. Second, if the non-food grant is quite significant in amount such that the poor household was able to save and accumulate the non-food grant, it can use the money to invest in a small business or in education such as technical-vocational courses. In this way, although the household will not be able to experience instant alleviation from poverty unlike those who receive food grant, there is likelihood that their investment may yield future returns. Those who invest in entrepreneurship may be able to establish a sustainable source of income. Likewise, those who invest in education will also be able to enjoy a better economic status by having a larger probability of finding meaningful employment in the future.

However, for a non-food grant to work, it must be a Conditional Cash Transfer (CCT) wherein recipient households are obliged to make productive use of the transfer. On the other hand, the government continues to provide food grants, such as the Food-for-School Program (FSP) of the Department of Education, because the government is unable to monitor where the CCTs are spent or invested in. Most of the time, poor households are unable to manage the cash transfer properly because they use it all at the contemporaneous period.

3.2. Operational Framework

We now attempt to empirically show that a grant is superior to a non-food grant in enhancing the welfare of the poor, a functional relationship between the government-sponsored programmes against poverty and target variables namely school participation and state of hunger. The results of the regression will be able to provide policy recommendations for improving the efficiency, effectiveness, and equity of food and non-food grant. The functional form is shown by equations (29) and (30).

$$SPR_i = f(WOMEN_i, HEALTH_i, SCHOLAR_i, TRAINING_i, HOUSING_i, CREDIT_i, ESTAT_i, FSIZE_i, TOTIN_i) + \varepsilon_i \quad (29)$$

$$SHG_i = f(WOMEN_i, HEALTH_i, SCHOLAR_i, TRAINING_i, HOUSING_i, CREDIT_i, ESTAT_i, FSIZE_i, TOTIN_i) + \varepsilon_i \quad (30)$$

where SPR_i is the school participation rate of household *i*. This is measured by the number of children in the household with ages ranging from 6 to 12 who are attending grade school divided by the total number of children in the household with ages ranging from 6 to 12 years old.

SHG_i is the number of times a household consumes food indicative of the state of hunger of a household *i*. Prevalence of hunger is a consequence of poverty which the government is trying to alleviate through various food and non-food grants. It assumes a value of 1 if the household experienced hunger and 0 otherwise.

$WOMEN_i$ is a proxy variable representing food programme and refers to the women empowerment programme related to gender issues such as availment of a feeding programme for pregnant women. It represents indirectly the food grant projects of the government given to the child through the mother. It is a dummy variable assuming a value of 1 if the household availed these programmes and 0 otherwise. The inclusion of this variable is in accordance with the studies of Del Rosso (1999).

$HEALTH_i$, $SCHOLAR_i$, $TRAINING_i$, $HOUSING_i$, and $CREDIT_i$, are the available government-sponsored programmes specifically medical and health related programmes, scholarship programmes, skills and livelihood training programmes, housing programmes, and credit programmes. These represent the various non-food grants provided by the government for these purposes. It is a dummy variable assuming a value of 1 if the household avails such programmes and 0 otherwise. The inclusion of these variables is in line with the studies of Del Rosso (1999).

$ESTAT_i$ is the employment status of the household head. This is a dummy variable indicating whether employment is permanent ($ES\_PERMANENT_i$), seasonal ($ES\_SEASONAL_i$), or temporary ($ES\_TEMPORARY_i$). This is indicative of the initiatives of the government in alleviating poverty through employment generation. Note that to avoid the dummy variable trap, the category of other employment status not elsewhere classified was dropped. The relevance of these variables was exposited by Lillard and Willis (1994) and Binder and Woodruff (1999).

$FSIZE_i$ is family size. The size of the family will have a negative impact on the school participation rate. Other things being equal, we expect that a smaller family will have a higher school participation rate. Larger families may tend to spend more on basic necessities like food, clothing, and shelter while education may take a second priority. The need for these variables was suggested by the studies of Hauser and Daymont (1977), Biblarz and Raftery (1999), Borromeo *et al.* (2007), and Tullao and Rivera (2008).

$TOTIN_i$ is household income that consists of earned family income, internal and external remittances and other sources of income. This is indicative of the financial capability of households in providing for their basic necessities as suggested by Borromeo *et al.* (2007) and Tullao and Rivera (2008). This may also pinpoint the location of households from the poverty line, thus showing the need for poverty-alleviating programmes sponsored by the government.

ε_i is the error term that captures all other variables that were not included in the equation.

If the coefficients of the government-sponsored programmes are positive and statistically significant in influencing school participation, then it may imply that these programmes are working on its intended objectives of enhancing the expected outcome of the education system. Likewise, if the coefficients of the government-sponsored programmes are negative and statistically significant in influencing the state of hunger, then it may imply that these programmes are working on its intended objective of reducing hunger. Lastly, if the coefficient of the feeding programme is less than the coefficients of the non-food grant, then it implies that the non-food grant is more effective in enhancing welfare than a food grant as argued in Section 3.1.

The Community Based Monitoring System (CBMS) Survey for Pasay in 2005 will be used to implement the model specification in Equations (29) and (30). Moreover, descriptive statistics will be generated to provide a picture of the extent to which government programmes reach the public. Furthermore, two regression analysis will be done. Equation (29) will be estimated using the Generalised Method of Moments (GMM) to analyse the statistical significance of the poverty-alleviation programmes of the government on its intended target of improving education. Meanwhile, Equation (30) will be subjected to the Maximum Likelihood Estimation (MLE) since the dependent variable, state of hunger of households, is a discrete variable explaining the probability of the occurrence of hunger.

4. Methodology

The study used the CBMS dataset, which is a poverty and policy-impact monitoring system that uses the database of household data at the local level for local planning, programme implementation and facilitation. Initial regression was done on the data from Pasay, Metro Manila for the year 2005. The limitation of this data is that there is no explicit data on food programmes, thus the study utilised women empowerment programmes specifically giving pregnant women food (pre-natal stage) to ensure the health of both the mother and child.

The first model measures the effect of the food programme, non-food programmes, income, and other demographic variables on school participation of children aged 6 to 12 years old. The cross-sectional data will be subjected to the GMM estimation methodology to analyse the statistical significance of the predetermined variables on school participation. Since the dataset is cross-sectional, it is plagued by the problem of heteroscedasticity (Gujarati and Porter 2009). According to Baum *et al.* (2003), the usual approach today when facing heteroscedasticity of unknown form is to use the GMM introduced by Hansen (1982), which makes use of the orthogonality conditions to allow for efficient estimation in the presence of heteroscedasticity of unknown form. Also, many standard estimators, including the Instrumental Variable (IV) and Ordinary Least Squares (OLS) are deemed as special cases of GMM estimators. Hence, in the presence of heteroscedasticity, the GMM estimator is more efficient than any other estimator (Baum *et al.* 2003).

Another reason why the GMM estimation technique is preferred is because of its robustness to differences in the specification of the data generating process (DGP). According to Greene (2003), under the GMM, a sample mean or variance estimates its population counterpart regardless of the underlying process. GMM provides this freedom from unnecessary distributional assumptions, such as the normality assumption under OLS that has made this method appealing. However, it must be noted that this comes at a cost because if more is known about the DGP such as its specific distribution, then the

method of moments may not make use of all of the available information. Hence, the natural estimators of the parameters of the distribution based on the sample mean and variance becomes inefficient. Thus, the method of maximum likelihood estimation (MLE) is the alternative approach which utilises this out of sample information and provides more efficient estimates (Greene 2003).

The linear specification of Equation (29) is shown in Equation (31):

$$SPR_i = f(WOMEN_i, HEALTH_i, SCHOLAR_i, TRAINING_i, HOUSING_i, CREDIT_i, ESTAT_i, FSIZE_i, TOTIN_i) + \varepsilon_i \quad (31)$$

The second model measures the effect of the same independent variables in the first model affecting state of hunger. Since the dependent variable, state of hunger, is a dummy variable, it will be modeled as a standard binary logistic model. For a binary outcome data, the dependent variable, y, takes one of two values as below:

$$y = \begin{cases} 1 & \text{with probability } p \\ 0 & \text{with probability } 1 - p \end{cases} \quad (32)$$

From equation (32), the dependent variable assumes a value of 1 if the household experiences hunger and assumes a value of zero if otherwise. According to Cameron and Trivedi (2005), there is no loss of generality in setting the values to 1 and 0 if all that is being modeled is p, which establishes the probability of the outcome.

Adapting completely the methodology of Cameron and Trivedi (2005) and Gujarati and Porter (2009), a regression model is formed by allowing the probability p to depend on a regressor vector $\mathbf{x}$ and a $K \times 1$ parameter vector β via a parametric technique. The model is of single-index form with conditional probability given by equation 33:

$$p_i = \Pr[y_i = 1|\boldsymbol{x}] = F(\boldsymbol{x}_i'\beta) \quad (33)$$

where $F(\cdot)$ is a specified function. To guarantee that $0 \leq p \leq 1$, it is natural to specify $F(\cdot)$ to be a cumulative distribution function (CDF). The logistic model arises if $F(\cdot)$ is the CDF of the logistic distribution. Note that if $F(\cdot)$ is a CDF, then this CDF is only being used to model the parameter p and does not denote the CDF of y itself (Cameron and Trivedi 2005).

There is a particular concentration in determining the marginal effect of a change in a regressor on the conditional probability that $y = 1$. For any probability model, given by equation 33, and change in the j^{th} regressor assumed to be continuous, this is shown by equation 34,

$$\frac{\partial \Pr[y_i=1|x_i]}{\partial x_{ij}} = F'(x_i'\beta)\beta_j \quad (34)$$

where $F'(z) = \partial F(z)/\partial z$. The marginal effects differ with the point of evaluation x_i, as in the case of any non linear model, and differs with different choices of $F(\cdot)$.

Considering an estimation given a sample (y_i, x_i) for $i = 1, \ldots, N$, where independence over i is assumed. The outcome is Bernoulli distributed for the binomial distribution with one trial. A compact notation for the density of y_i is its probability of mass function as shown by equation (35).

$$f(y_i|x_i) = p_i^{y_i}(1-p_i)^{1-y_i} \quad for\ y_i = 0,1 \tag{35}$$

where $p_i = F(\mathbf{x}_i'\beta)$. This yields probabilities p_i and $(1-p_i)$ since $f(1) = p^1(1-\mathrm{p})^0 = p$ and $\mathrm{f}(0) = p^0(1-\mathrm{p})^1 = p$. The density shown in equation (34) shows log density $\ln f(y_i) = y_i \ln p_i + (1-y_i)\ln(1-p_i)$. Given independence over i and equation (34) for p_i, the log-likelihood function is given by:

$$L_N(\beta) = \sum_{i=1}^{N} \{y_i lnF(x_i'\beta) + (1-y_i)\ln(1-F(x_i'\beta))\} \tag{36}$$

Differentiating with respect to β, the MLE $\hat{\beta}_{ML}$ solves equation (37):

$$\sum_{i=1}^{N} \left\{ \frac{y_i}{F_i} F_i' x_i - \frac{1-y_i}{1-F_i} F_i' x_i \right\} = 0 \tag{37}$$

where $F_i = F(\mathbf{x}_i'\beta)$, $F_i' = F'(\mathbf{x}_i'\beta)$, and $F'(z) = \partial F(z)/\partial z$. Converting to fractions with common denominator $F_i(1-F_i)$ and simplifying, yields the ML first order condition is shown by:

$$\sum_{i=1}^{N} \frac{y_i - F(x_i\beta)}{F(x_i'\beta)(1-F(x_i'\beta))} F'(x_i'\beta)x_i = 0 \tag{38}$$

Cameron and Trivedi (2005) highlight that the MLE is consistent if the conditional density of y given $\mathbf{x}$ is correctly specified. Since the density is Bernoulli, the only possible misspecification is that the Bernoulli probability is incorrectly specified. Therefore, the MLE is only consistent if $p_i = F(\mathbf{x}_i'\beta)$.

Given this backdrop on QRM, the logistic regression model is specified in equation 39. According to Gujarati and Porter (2009), the binary logistic model is the simplest unordered model that allows regressors to differ between two alternatives. Moreover, according to Cameron and Trivedi (2005), the marginal effect for binomial data is computed as a separate marginal effect on the probability of each outcome, and these marginal effects sum to zero since probabilities sum to one.

$$p = \Lambda(\mathrm{x}'\beta) = \frac{\exp(x\prime\beta)}{1+\exp(x\prime\beta)} \tag{39}$$

where $\Lambda(\cdot)$ is the logistic CDF, with $\Lambda(z) = e^z/(1+e^z) = 1/(1+e^{-z})$. Moreover, the logistic MLE first order condition, as seen in equation (40), simplifies to:

$$\sum_{i=1}^{N} (y_i - \Lambda(x_i'\beta))x_i = 0 \tag{40}$$

since $\Lambda'(z) = \Lambda(z)[1-\Lambda(z)]$. Thus, the raw residual, $y_i - \Lambda(\mathbf{x}_i'\beta)$, is orthogonal to the regressors, similar to the Ordinary Least Squares (OLS) regression. Meanwhile, if the regressors x_i include an intercept, then equation (40) implies that $\sum_i (y_i - \Lambda(x_i'\hat{\beta})) = 0$, so the logistic

residuals sum to zero (Cameron and Trivedi 2005). This implies that the average in-sample predicted probability $N^{-1}\sum_i \Lambda(x_i^{'}\hat{\beta})$ necessarily equals the sample frequency $\bar{y}$.

The marginal effects for the logistic regression model can be obtained from the coefficients, since $\partial p_i/\partial x_{ij} = p_i(1-p_i)\beta_j$, where $p_i = \Lambda_i = \Lambda(\mathbf{x}_i'\beta)$. Evaluating at $p_i = \bar{y}$ yields a crude estimated marginal effect of $\bar{y}(1-\bar{y})\hat{\beta}_j$. As such, the interpretation of the coefficients is in terms of marginal effects on the odds ratio rather than on the probability (Cameron and Trivedi 2005). For the logistic regression model, the specification is:

$$\ln\left(\frac{p_i}{1-p_1}\right) = x'\beta + \varepsilon \tag{41}$$

where $p_i/(1-p_i)$ measures the probability that $y = 1$ relative to the probability that $y = 0$, which is called the odds ratio or relative risk (Gujarati and Porter 2009). For the logistic regression model, the log-odds ratio is linear in the regressors (Cameron and Trivedi 2005).

The logistic specification of the variables influencing the probability that the household will engage in entrepreneurial activities is given by:

$$\ln\left(\frac{p_i}{1-p_1}\right) = f(WOMEN_i, HEALTH_i, SCHOLAR_i, TRAINING_i, HOUSING_i, CREDIT_i, ESTAT_i, FSIZE_i, TOTIN_i) + \varepsilon \tag{42}$$

where p_i is the probability that a household experiences hunger while $(1-p_i)$ is the probability that a household does not experience hunger.

5. Results and Discussion

5.1. Description of Pasay

Pasay is the third smallest political subdivision in the National Capital Region (NCR) and comprises 7 districts with 20 zones and 200 barangays as reported in the official website of the local government of Pasay. The 2000 Census reported a population of 363,000, a 2.43 per cent reduction from the 1995 data. Its prime location is home to various utilities and commercial activities. Based on the data of Pasay City Business Permits and License Division in 2000, the leading industries of Pasay include retail and general merchandising, professional services, and utility services. Over the years, the city has experienced artificial land scarcity due to the continuous urban sprawl resulting in a shortage of available space for socialised housing among others. Table 3 shows the descriptive statistics of the Pasay 2005 database.

5.2. The Effect on School Participation

We first utilised the GMM model to determine the effect of the food programme, non-food programmes, income, and other demographic variables on school participation of children with age 6 to 12 years old for the year 2005 in Pasay. The regression results are summarised in Table 4.

Table 3. Descriptive statistics for Pasay city

Variable	Number of households	Mean	Standard deviation	Minimum	Maximum	Skewness
School Participation rate (if the number of children between 6 to 12 years old is positive)	12,197	0.78878	0.37194	0	1	-1.42401
Total household Income (for total household income ≤ 10,000,000 only)	59,143	208,181.7	216,744.2	0	7,392,000	8.16568
Employment status	59,181	-	-	-	-	-
Permanent	35,533	-	-	-	-	-
Seasonal	16,282	-	-	-	-	-
Temporary	6,654	-	-	-	-	-
Others NEC	712	-	-	-	-	-
Household size (for household size ≤ 20 only)	59,173	4.19524	2.03895	1	19	0.85685
Number of children aged 6 to 12 who are attending elementary school	35,415	0.42414	0.76120	0	6	1.92236
State of hunger	59,193	-	-	-	-	-
Experienced hunger	720	-	-	-	-	-
Did not experience hunger	58,473	-	-	-	-	-
Received Government programmes (out of 48,552)						
Women empowerment	1189	-	-	-	-	-
Health	13,435	-	-	-	-	-
Scholarship	677	-	-	-	-	-
Training	338	-	-	-	-	-
Housing	295	-	-	-	-	-
Credit	374	-	-	-	-	-

Table 4. GMM linear regression estimates (Dependent variable: SPR_i-)

Variable	Coefficient	*p*-value
WOMEN	0.0437768	0.114
HEALTH	0.0278652	0.001**
SCHOLAR	0.0669084	0.003**
TRAINING	0.0356497	0.449
HOUSING	0.0384380	0.515
CREDIT	0.1132079	0.035*
ES_SEASONAL	0.0485610	0.236
ES_PERMANENT	0.0454139	0.260
ES_TEMPORARY	0.0435863	0.296
TOTIN	0.0000000	0.000**
HSIZE	-0.0041595	0.040*
Constant	0.7557863	0.000
Number of observations		8989
F(11, 8977)		4.51
Prob > F		0.0000
R-squared		0.0032

**significant at 5% level; * significant at 10% level

The linear GMM estimated model was tested for multicollinearity and heteroscedasticity which are endemic in a cross-section dataset. The results showed the overall mean VIF 5.21 to be less than 10 which implies that there is tolerable multicollinearity. The model, however, was heteroscedastic and was corrected using Breusch-Pagan/Cook-Weisberg tests. The significant variables were non-food programmes such as *HEALTH, SCHOLAR, CREDIT*, as well as *TOTAL INCOME*, and *HOUSEHOLD SIZE.* The non-food programme *SCHOLAR* had the highest effect on the dependent variable school participation rate. Holding other factors constant, if the household receives a scholarship programme, school participation is higher by 6.7 per cent. This non-food programme directly affects children between ages 6 to 12 years old as it avoids dropping out of school or repeating a year level. *CREDIT* programme was also found to be significant. Access to *CREDIT* results in higher school participation of children by 11.3 per cent as opposed to no access to credit. Another significant variable was *INCOME* but its effect on school participation rate was infinitesimally small. One reason for this is because *INCOME* here could be transitory and may not sustain the direct and indirect costs associated with education, especially a poor family. Alternatively, this can be linked to the fact that basic education in the Philippines is widely publicly provided, so for whatsoever reason, children will really be in school. Another implication is the *INCOME* effect on school participation rate. Since the coefficient was positive, it implies that school participation rate is treated as a normal good which as income increases, also increases school participation rate. Another insight on why the effect of *INCOME* is almost zero is because basic education is free in public schools thus children who belong to low income families can still go to school. Lastly, the *HOUSEHOLD SIZE* negatively affects school participation rate. As the number of household members increases, the less likely each child would be able to go to school. This is true especially if the family

falls below the poverty line. The family would have to sacrifice some of the children going to school just to meet the most basic need which is food. This is supported by the substitution effect theory.

5.3. The Effect on Incidence of Hunger

The next model shows the results of the probability logistic regression for incidence of hunger. Table 5 summarises the marginal effects with the assumption that the people do not benefit from the food and non-food programmes of the government.

The overall value of the dependent variable in the marginal effects after logistic model implies that there is a 2.9 per cent probability of a family experiencing hunger if there are changes in any of the independent variables. The variables that are highly significant are employment from seasonal, permanent and temporary, total income and household size. Permanent employment has the highest effect on the incidence of hunger. The incidence of hunger is lower by 2.3 per cent if the household head is permanently employed. Seasonal employment also has the same effect and magnitude on the incidence of hunger. Another highly significant variable affecting the incidence of hunger was income. Although the effect is almost zero, an increase in income may help address the incidence of hunger. Household size also positively and significantly affects the incidence of hunger. The feeding programme, substituted by women empowerment programme, was also significant and entails a lower state of hunger by 1.6 per cent as opposed to those who did not receive any programme. On the other hand, access to credit, a non-food programme, positively affects the incidence of hunger by reporting a 3.5 per cent differential probability which may appear counter-intuitive. The explanation behind this could be that monetary benefit from the credit programme could have been used for other activities such as vices other than buying food for the family. The food and non-food programmes did not turn out to be as significant as the other variables because they do not directly address hunger.

Table 5. Marginal effects (recipients did not avail the programme) (Dependent variable: Probability of SHG_i)

Variable	*dy/dx*	*p*-value
WOMEN	0.015694	0.0760*
HEALTH	0.002677	0.3070
SCHOLAR	0.016923	0.1200
TRAINING	0.029394	0.1350
HOUSING	0.013772	0.4510
CREDIT	0.034716	0.0650*
ES_SEASONAL	-0.020279	0.0000**
ES_PERMANENT	-0.023803	0.0000**
ES_TEMPORARY	-0.016063	0.0010**
TOTIN	-1.86E-07	0.0000**
HSIZE	0.006648	0.0000**
Number of obs	48,488	
Predicted probability	0.0295	

**significant at 5% level; * significant at 10% level

Table 6. Marginal effects (Recipients availed the programme) (Dependent variable: Probability of SHG_i)

Variable	*dy/dx*	*p*-value
WOMEN	0.005134	0.1060
HEALTH	0.001226	0.3410
SCHOLAR	0.005391	0.1450
TRAINING	0.007394	0.1190
HOUSING	0.004703	0.4000
CREDIT	0.008013	0.0930*
ES_SEASONAL	-0.031436	0.0140**
ES_PERMANENT	-0.058225	0.0120**
ES_TEMPORARY	-0.017314	0.0130**
TOTIN	-9.27E-08	0.0480**
HSIZE	0.003316	0.0480**
Number of obs		48,488
Predicted probability		0.0145

**significant at 5% level; * significant at 10% level

Table 6 summarises the marginal effects with the assumption that the people benefited from the food and non-food programmes of the government.

The overall value of the dependent variable in the marginal effects after the logistic estimated model implies that there is a 1.4 per cent probability of a family experiencing hunger if the family benefited from the food and non-food programmes. The results are similar to that of the previous table. The employment status of the household head was the variable with the highest significance in affecting the incidence of hunger. A household is less likely to experience hunger by 5.8 per cent if he/she is employed permanently. Total income, household size and credit were also significant in explaining the incidence of hunger.

6. Conclusions and Policy Recommendations

Most government programmes aimed at alleviating poverty are unsuccessful in targeting the supposed beneficiaries due to errors of inclusion and errors of exclusion. As per the estimated coefficients, food and non-food programmes in Pasay were found to have an insignificant impact in addressing school participation rate and incidence of hunger. However, it must be noted that insignificance does not imply lack of influence for it may simply reflect the lack of power. Likewise, the insignificance for some government-sponsored programmes does not imply the irrelevance of that variable. This study tried to determine whether a food grant is better than a non-food grant in addressing poverty issues and identified the factors that contribute to increasing school participation and reducing the incidence of hunger.

Based on the GMM regression results, a non-food grant proved to be better than a food grant because the variable appeared highly significant. Non-food grant programmes such as health and scholarship programmes are effective in increasing school participating rate among children in the age group 6 to 12 years old. The results are consistent with the literature which stipulates that health play a vital role in a child's participation in school.

One of the primary reasons why children drop out of school is because of health reasons such as malnutrition. The second variable found to be significant was scholarship programmes. This definitely has a positive effect on school participation. The scholarship programme increased school participation by as much as 6.7 per cent, the variable which had the highest impact on school participation.

The logistic regression results for incidence of hunger showed slightly different results. For the first marginal effects as shown in Table 5, the food programme and one non-food programme turned out to be significant. However, the non-food programme coefficient was counter intuitive. Access to the credit programme increased the incidence of hunger by 3.5 per cent and this can be attributed to the fact that the credit programme is a monetary grant that may not necessarily address the food insecurity concerns of the household due to other priorities such as education, entrepreneurship, or sometimes vices. The second marginal effects, shown in Table 6, displayed similar results except that the food programme was not found to be significant.

Other demographic variables that were found to significantly affect school participation and incidence of hunger were income and household size. For the GMM regression on school participation rate, the family's income positively affects the child's school participation but only at a very infinitely small level. This could be due to the fact that income is transitory for most families living below the poverty line since they do not have permanent work. On the other hand, as the family size increases, the probability of a child going to school decreases. The logistic regression on incidence of hunger also proves that an increase in income reduces the incidence of hunger while an increase in family size increases the incidence of hunger. The dummy variables representing employment were also significant in explaining the incidence of hunger. If the household head is permanently employed, the incidence of hunger is lower by 2 per cent.

Based on the empirical results, non-food programmes were found to be more effective in addressing school participation and incidence of hunger in Pasay. In the local government's allocation of resources to the poor, it would be beneficial if they implement programmes aimed at providing health benefits and scholarship programmes in increasing school participation rates among elementary students especially in public schools. Caution, however, has to be practised in identifying the beneficiaries of these programmes in order to minimise inefficiencies and waste of resources.

In the case of incidence of hunger, credit programmes were found to be weakly effective because the estimated coefficient is counterintuitive to address the problem. The programme has to be restructured to make sure that the beneficiaries experience lower incidence of hunger through improvements in income generation provided by the credit programme. Long term benefits from the credit programme will only be realised if the financial support is used for income-augmenting purposes such as sustainable livelihood programmes and entrepreneurial activities. The local government may assist in providing training programmes.

Poverty is a multi-faceted issue whose root causes need to be addressed in order to see a decline in rates. Poor school participation rate and high incidence of hunger are just some of the manifestations of poverty. Further studies need be done to ascertain if these findings hold for other provinces in the Philippines where poverty is prevalent.

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