The Determinants of Household Poverty in Fiji

Neelesh Gounder

Department of Accounting, Finance and Economics

Griffith Business School

Griffith University

Queensland, Australia.

Email: n.gounder@griffith.edu.au

The Determinants of Household Poverty in Fiji

Abstract

This paper uses household survey data to model the determinants of household poverty in Fiji. A multivariate empirical analysis is conducted to ascertain those household characteristics important in determining household welfare and poverty. The ordinary least squares (OLS) estimation results show that higher levels of education, supporting agricultural growth policies and reallocation of labour into the formal sector of the economy will prove effective in reducing poverty at the household level. The robustness of the results is checked by estimating a probit model. The probit estimates show the coefficients are robust to an alternative empirical approach.

Key words – poverty, household, multivariate analysis, South Pacific, Fiji

1. Introduction

Although Fiji has experienced a steady rise in the Human Development Index (HDI), which integrates income, access to education, health services and gender equality, during the period 1975 (0.663) to 2004 (0.758), poverty has increased at the same time. The rate of poverty at independence in 1970 was 7 per cent. Since then it has increased almost five fold and currently stands at around 35 per cent. Both the incidence and the severity of poverty increased between the three Household Income and Expenditure Surveys (HIES), with levels of 15 percent in 1977, 25 percent in 1990/91, and 34 percent in 2002/03 (Chand, 2007; Barr, 2007). Fiji is a signatory to the Millennium Development Goals (MDG) and has committed to achieving the MDG targets by the year 2010. It is also a party to the Monterrey Consensus, and the World Summit on Sustainable Development, both of which promote the eradication of poverty. In fact the concept of poverty eradication has occupied centre stage in development issues in Fiji since independence. Every Development Plan of successive governments, its successor Strategic Development Plan and the annual budget addresses have noted unambiguous policies to reduce poverty.

Fiji enjoyed high growth rates in the 1970s but growth had slowed by the early 1980s when the economy grow by a little more than 2 per cent, insufficient to expand employment opportunities to the growing labour force. The 1987 political crisis added a further blow to the economy as GDP contracted by more than 6 per cent and

investment levels dropped significantly. The first signs of increasing poverty, both absolute and relative, were now apparent (Bryant, 1992). By the 1990s, it was obvious that a proactive approach was required. Accordingly the 1992 budget created a Poverty Alleviation Fund (PAF) to provide capital funding to the poor. An amount of F$7m was set aside in the 1992 budget to be distributed through Non Governmental Organizations (NGOs). The newly established PAF was considered a scheme that offered a broader approach to poverty alleviation, which had until 1991 consisted of mainly a Family Assistance Scheme. Policy failures are not uncommon in Fiji. Within two years of implementation, PAF generated several criticisms. Issues such as high administrations costs, limited rate of disbursements and slow response to applications, propelled the government towards a review. The outcome of the review led the government to integrate the different poverty alleviation programs. Other programs such as the Family Assistance Scheme, basic education support, and basic health were integrated more closely with the funding of poverty alleviation.

With the recognition of the fact that poverty is multifaceted problem with a variety of causes, new programs have been added to the list and funding has been substantially increased. Relatively new challenges such as the increase in squatter settlements have added new dimensions to the poverty agenda. By 2007 about 12.5 per cent of Fiji's population was living in more than 200 squatter settlements around the country (Barr, 2007). Programs towards poverty alleviation now include upgrading of squatter settlements, farming assistance, remission of school fees, grants to NGOs, micro-finance

schemes and safety net programs for the destitute including the Family Assistance Scheme (Strategic Development Plan 2003 – 2005, 2002). In 2002, the government allocated F$90m towards expenditure on these programs. A government policy statement summarised that the approach is based on three pillars: providing income earning opportunities for the poor, providing the necessary skills and knowledge for the poor to take up the income earning opportunities and providing a social safety net for those who are unable to assist themselves.

Despite the various poverty alleviation policies over the years by successive governments, it is clear that the poverty objective has not been achieved. The government clearly acknowledges this in its Strategic Development Plan 2003-2005. It notes that "Despite government's continuous efforts to combat poverty, the proportion of households living in poverty has continued to escalate, increasing from 15 percent in 1983 to 25 percent in 1996…" (Strategic Development Plan 2003-2005, 2002). A World Bank report notes that from 1976 to 1993 those families on the family assistance scheme grew by 61 per cent in 17 years (World Bank, 1995). Further evidence of the failure of the polices is provided by Kaitani (2007) who analysed the effectiveness of two components of poverty alleviation, the family assistance scheme and poverty alleviation project introduced in 2004, and concluded that these have "…not been successful in assisting the poor to improve their living standards and end poverty".

Empirical studies on the micro level determinants of poverty are nonexistent in Fiji. This thus is the first study which attempts to model the determinants of poverty at the household level and is the major contribution of this paper. One possible reason for the nonexistent of empirical studies of the sort attempted in this paper could be due to the non availability of a rich dataset such as the 2002-2003 HIES. While the poverty report by the Fiji Islands Bureau of Statistics based on the 2003-2003 HIES does provide specific household and regional characteristics that correlate with poverty, it does not provide whether these characteristics are the true determinants of household poverty and welfare. The determinants of poverty investigated in this paper therefore will increase our understanding of this relationship by inferring the causality of various household and regional characteristics on household poverty. This is the second contribution of this paper. Additionally, since different estimations are used for the different geographic divisions in Fiji, this study will identify the key factors that account for regional poverty differentials so as to contribute to specific strategies to targeting of programmes for the poor.

The rest of the paper is organised as follows. An analysis of poverty and income distribution in Fiji is provided in the next section. In particular, section two presents a big picture as to what happened to poverty and income distribution in the last three decades. Section three discusses the theoretical framework and the methodology used. Section four models the household determinants of poverty and provides a discussion of

the empirical evidence while the penultimate section provides an analysis of the robustness check results. Concluding remarks are provided in the final section.

2. Poverty and Income Distribution: The Big Picture

The data on poverty in Fiji is only available through the national HIES which were conducted in 1977, 1990-1991 and 2002-2003. Results from the 1977 survey were compiled and analysed by Stavenuiter (1983) while the 1990-1991 survey was reported through the Fiji Poverty Report (1997). The latest estimates of poverty that is the focus of this study have been compiled by Narsey (2008) for the Fiji Islands Bureau of Statistics using 2002-2003 Household Income and Expenditure Survey and the 2004-2005 Employment and Unemployment Survey. Unlike the previous two surveys, the 2002-2003 HIES offers a rich dataset as the questions used were more extensive than the previous surveys. Noting that poverty may be defined in various ways, 2002-2003 HIES uses income deprivation as the primary indicator. The estimates of incidence of poverty based on a Basic Needs Poverty Line (BNPL) are shown in Table 1. The BNPL is the money value of goods and services that a household requires to consume in order to ensure what a society considers to represent a minimum decent standard of living. Any household with income below a specified BNPL at a particular point in time is regarded as poor. As stated earlier, Table 1 shows poverty has increased significantly over time. There has been a 20 percentage point increase in the incidence of poverty between 1977 and 2003-2003. The table also shows a significant increase in rural poverty

between 1991 and 2002-2003. Table 2 provides percentage incidence of poverty based on different values of BNPL for 2002-2003. For any levels of BNPL, the incidence of poverty is greater in rural areas. As expected the incidence of poverty in both rural and urban areas increase as BNPL per adult equivalent increases.

Table 1: Percentage incidence of poverty, 1977, 1991 and 2002-2003

	1977	**1991**	**2002-2003**
Rural	21	24	40
Urban	11.6	27	29
National	15	25.5	35

Source: Stavenuiter (1983), Fiji Poverty Report (1997) and Narsey (2008).

Table 2: Percentage incidence of poverty for a given BNPL per adult equivalent, 2002-2003

	BNPL per Adult Equivalent per week (F$)					
	$30	$31	$32	$33	$34	$35
Rural	37	39	41	43	45	47
Urban	20	21	22	24	25	26
All Fiji	**29**	**31**	**33**	**35**	**36**	**38**

Source: Narsey (2008)

Table 3 provides Gini coefficients for households and population ranked by household income and income per capita. Based on shares of population and ranking by total household income gives a Gini of 0.36, while ranking by income per capita is 0.41. The overall distribution of income remained stagnant between 1977 and 1991 at 0.43. However, there has been a minor improvement in 2002-2003. In terms of the actual poverty gap (the difference between national poverty line and the average income of a poor household), 2002-2003 gap is F$2617 ($8062 - $5445). Table 4 gives percentage incidence of poverty by division and rural and urban areas. Fiji is separated into four divisions: Central, Eastern, Northern and Western.

Table 3: Gini coefficients (all households), 2002-2003

	Population	**Households**
Household Income	0.36	0.40
Income per capita	0.41	0.33

Source: Narsey (2008)

While table 4 shows that while poverty is widespread in Fiji, the poverty gap is greater in rural areas in all divisions. The Northern Division has the highest levels of urban and rural poverty, 56 per cent and 39 per cent respectively. With a lethargic economy and large number of sugarcane farmers being displaced due to expire of land leases, this is

hardly surprising. The region was also neglected by the government for a long time, particularly in the area of development focus. As a result of lack of economic opportunities, the Northern Division has also experienced high migration of educated individuals and their families to other parts of the country.

Table 4: Percentage incidence of poverty (by division and rural/urban), 2002-2003

	Central	Eastern	Northern	Western	All
Rural	28	35	56	38	40
Urban	24	34	39	34	29
All	26	35	53	37	35

Source: Narsey (2008)

3. Conceptual Framework and Methodology

The key approach in this paper is similar to Mukherjee and Benson (2003) and is based on modeling the natural logarithm of total per capita consumption of households, which serves as the household welfare indicator, against a set of exogenous determinants such as household and community characteristics. The conceptual model can be written as follows

$$lnC_j = \beta x_j + \varepsilon_j$$

where C_j is the total per capita consumption of household j (the dependent variable), x_j is the set of exogenous determinants (independent variables), and ε_j is a random error term. The ordinary least squares (OLS) estimate of the model will provide the average, systematic relationship between household welfare and the determinants of poverty. As the right hand side includes several variables on household, community and regional characteristics, the model allows the multivariate analysis needed to analyse the intricate relationships between these variables and household welfare status. Household poverty is a multifaceted phenomenon with several causes and it is important to include as much as possible the relevant characteristics fundamental to household welfare. In particular, this modeling strategy for poverty will provide a deeper insight as to how specific household, community and regional level characteristics affect poverty status conditional on the level of other household characteristics also serving as potential determinants of poverty.

For robustness checks, a probit regression is also estimated with the probability of a household being in poverty as the dependent variable and the identical set of independent variables used in the OLS regression. In this case the dependent variable is a dummy defined as:

pov = [1 if the household is below poverty line, 0 if otherwise]

and; $\Pr(pov = 1/X) = F(X, \beta)$

$$\Pr(pov = 0 / X) = 1 - F(X, \beta)$$

where X is the vector of the household, community and regional level characteristics. β is the set of parameters reflecting the impact of changes in X on the probability. This approach assesses the determinants of poverty by estimating the households' probability of being poor.

4. Data and Variables

Data

The 2002-2003 HIES is utilized for this investigation as this is the most recent data available. This is also one of the most comprehensive surveys conducted in Fiji and is a nationally stratified survey of households in both rural and urban areas. An urban area was defined by the general character of the area, and distance from urban area was used to determine a rural area. The survey was conducted continuously for one year from March 2002 to February 2003. Apart from recording detailed household income and expenditure, the survey also recorded a range of household and community characteristics. Household income consisted of income from employment (both paid and self employment), property income, income from production of household services for personal consumption, and transfers received. Household expenditure consisted of the sum of household consumption expenditure and household non-consumption expenditure.

Dependent variable

There exists considerable debate about whether to use income or consumption to measure household welfare. While acknowledging the advantages and disadvantages of each as a measure of welfare, this estimation follows Ravallion (1992) in choosing consumption rather than income. The natural log of real per capita household expenditure (*lnpcexp*) is employed as the dependent variable for the regression analysis. While household expenditure (unlogged) was used a measure of welfare for the poverty analysis of the HIES, the use of a consumption based measure of welfare for this investigation is motivated by two considerations. First, particularly in rural areas, income is often lumpy as farmers and subsistence households usually receive cash income during particular periods of the year. In other words, expenditure and consumption is a smoother measure of welfare than income (Mukherjee and Benson, 2003). Second, it is the actual consumption and non-consumption expenditure which determines the realised standard of living (Narsey, 2008; Silva, 2008). Further, as argued by Ravallion (1992), consumption contains smaller measurement error compared with income.

Independent variables

The potential determinants of poverty were selected based on factors likely to affect household welfare. Another criterion for selecting the potential determinants was exogeneity. In order to infer the relationship between the variables, endogenous variables – variables that may be affected by current household expenditure – were excluded. Therefore, only exogenous variables but those which determine the current

level of household expenditure were selected. The variables are based on household and individual characteristics, regional level characteristics and community level characteristics. The literature on the micro level determinants of poverty has also been used a guide in selecting the relevant variables. The set of regressor chosen as possible determinants of poverty in Fiji are the following:

- *eduattain_head*: represents education of the household head (years of schooling).
- *area*: represents rural or urban area (urban = 0 and rural = 1).
- *age_head*: age of household head (in years).
- *age_head2*: represents square of age of household head (age_head).
- *hhold_size*: total number of members in the household.
- *hhold_size2*: square of total number of members in the household.
- *sex_head*: sex of the household head (male = 0 and female = 1).
- *subsistence*: whether involved in subsistence activity of not.
- *electricity*: electricity available in the area (no = 0 and yes = 1)
- *hethnic_head*: ethnicity of the household head (indigenous Fijian = 1 and non-indigenous Fijian = 0)
- *mstatus_head*: marital status of the head of the household (married = 1 and 0 otherwise)

- *housing*: whether dwelling unit is owned (yes = 1 and no = 0)
- *eastern*: household in Eastern division (1/0)
- *western*: household in Western division (1/0)
- *northern*: household in Northern division (1/0)
- *central*: household in Central division (1/0)

The definition of most variables is apparent from the brief explanation above. Nevertheless, additional explanation is provided from the perspective of the broad characteristics. Among the household and individual variables is the maximum education level attained by any adult in the household. It has been widely recognised that education has powerful impact on poverty. As household heads are the main income earners in the household, education level of household heads should be a critical factor in determining household welfare. Other household characteristics include age of the household head and its square, household size and its square, sex of the household head and ethnicity of the household head. With respect to household size, there is strong evidence that it is negatively correlated with consumption or income per person in developing countries (Lanjouw and Ravallion, 1995). Squared of household size is required to capture the possibility of nonlinear effects on household poverty. The gender variable takes care of the assumption that a female headed household is generally associated with greater vulnerability to poverty. The literature on micro level determinants of poverty has

identified three possible reasons for this, commonly referred to as the "triple burden", which include the disadvantages faced by the females in the labour market, additional responsibilities of household chores and child care, and a higher dependency ratio for being a single income earner (Mallick and Rafi, 2009; Fuwa, 2000).

Ethnicity of the head of the household is a relevant household variable for Fiji as the final report of the HIES notes that there exists ethnic differences in poverty incidence. Ethnicity is important not only from an economic perspective but from a political perspective as well since the use of ethnicity as a disadvantage to design exclusively affirmative action programs has been one of the most contentious issues in Fiji's politics in the last decade. Among the community and regional level variables are the availability of electricity as a source of light in the community, and the area within which the household is located. As the availability of electricity is not a household level issue, it cannot be considered endogenous. Whether the household is located in a rural or urban area is critical as the HIES indicates important rural and urban poverty gaps. The area variable therefore also proxies for remoteness and is likely to capture if there exists a greater vulnerability to poverty of rural populations. In addition, rural households suffer from lack of equal opportunities compared to their counterparts in urban areas, have low education levels and are more apt to be outside of the formal labour force. Subsistence variable is used as a dummy to capture households dependent on 'home consumption' or the influence of small farming occupation on poverty.

One concern with regressing household determinants of poverty of this nature is the assumption that determinants are same everywhere in the country. However, regional heterogeneity can be integrated by running separate regressions for different locations. This would imply that the model does not assume the determinants of poverty are same everywhere in the country. As a result this paper estimates six different regressions based on four official divisions (Central, Western, Northern, and Eastern) in which data was collected. The other two regressions estimations are for rural and urban households, estimated separately. It is also noted from the HIES that the incidence of poverty varies widely across the regions. Indeed Section 2 highlighted that the Northern division has the highest levels of poverty among all the divisions. The different divisions are included as dummy regressors in each of the rural and urban specifications. While dummy variables are a useful way to capture regional factors in a model of this type, it may also lead to exact collinearity. In this instance, the division categories are exhaustive, and the sum of the division dummy variables is Central + Western + Northern + Eastern = 1. As a result, the 'division dummy variable' is an exact linear combination of the division dummies. The error of including all the four divisions is also commonly known as the dummy variable trap (Hill, Griffiths and Lim, 2008). One way to get around this problem is to omit one dummy variable, which is then defined as the reference group. In this paper, *central* dummy variable is omitted and thus identifies the reference group for the two equations. Of the final data set of 5,215 households for the determinants of poverty analysis, 2,164 are in the Central area, 1992 households in Western, 794

households in Northern, 267 households in Eastern, 2230 household in the rural area and 2987 households in the urban area.

5. Results and Discussion

The parameter estimates of the OLS regression are shown in Table 5. Since the model is in the log-linear form, a convenient interpretation of the model is a one unit increase in the independent variable leads to a percentage change in per capita income equivalent to the estimated regression coefficient of the independent variable. The results contain separate parameter estimates of the regression model for each of the four divisions (Central, Western, Northern and Eastern) and the two areas based on the whole sample (rural and urban). Recall that only three divisions are included in the urban and rural estimation, *central* has been omitted.

Table 5: Results from OLS regressions

Variable	**Central**	**Western**	**Northern**	**Eastern**	**Rural**	**Urban**
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
	(*t*-Statistic)	(*t*-Statistic)	(*t*-Statistic)	(*t*-Statistic)	(*t*-Statistic)	(*t*-Statistic)
eduattain_head	0.035	0.036	0.011	0.028	0.032	0.030
	(15.43)***	(14.67)***	(3.32)***	(4.22)***	(14.21)***	(15.90)***
area	-0.038	-0.273	-0.289	-0.045	-	-

	(-1.09)	(-10.06)***	(-4.94)***	(-0.33)	-	-
age_head	0.028	0.021	0.012	0.019	0.014	0.028
	(5.14)***	(4.32)***	(1.54)	(1.21)	(3.11)***	(6.15)***
age_head^2	-0.0002	-0.0001	-0.0001	-0.0002	-0.0001	-0.0002
	(-4.11)***	(-2.80)***	(-1.69)*	(-1.47)	(-1.98)**	(-5.11)***
hhold_size	-0.264	-0.340	-0.276	-0.332	-0.329	-0.294
	(-13.31)***	(-15.37)***	(-8.50)***	(-5.98)***	(17.08)***	(-16.50)***
hhold_size^2	0.011	0.016	0.012	0.013	0.014	0.013
	(7.26)***	(8.80)***	(5.15)***	(2.91)***	(9.80)***	(9.35)***
sex_head	0.064	-0.002	-0.090	-0.108	0.004	0.012
	(1.24)	(0.97)	(-0.91)	(-0.72)	(0.09)	(0.26)
subsistence	0.038	0.003	-0.065	0.083	-0.002	0.009
	(1.31)	(0.12)	(-1.30)	(0.99)	(0.11)	(0.39)
electricity	-0.485	-0.294	-0.291	-0.149	-0.207	-0.659
	(-12.01)***	(-7.82)***	(-5.80)***	(-1.95)*	(-8.07)***	(-15.30)***
hethnic_head	0.055	-0.0006	-0.082	0.214	-0.026	0.032
	(2.37)**	(-0.26)	(-2.04)**	(2.22)**	(-1.10)	(1.68)*
mstatus_head	0.041	0.035	-0.007	-0.103	0.044	0.011
	(0.89)	(0.72)	(-0.08)	(-0.78)	(0.09)	(0.28)
housing	0.054	0.035	0.007	0.177	0.105	0.048
	(1.49)	(0.92)	(0.07)	(0.67)	(1.16)	(1.73)*
eastern	-	-	-	-	-0.033	-0.096
	-	-	-	-	(-0.77)	(-0.75)

western	-	-	-	-	-0.032	-0.180
	-	-	-	-	(-10.52)***	(-6.88)***
northern	-	-	-	-	-0.363	-0.098
	-	-	-	-	(-9.96)***	(-2.22)**
constant	7.50	7.71	8.27	8.08	7.84	7.76
	(52.87)***	(57.33)***	(37.47)***	(16.27)***	(51.68)***	(63.95)***
R-squared	0.34	0.43	0.25	0.47	0.41	0.33
F-statistic	95***	127***	22***	19***	110***	106***
Households	2164	1992	794	267	2230	2987

Notes: *t* statistics are in parenthesis; (***), (**) and (*) denote significance at the 1%, 5% and 10% levels respectively; dependent variable is log of per capita household consumption.

With a few exceptions, the signs on the parameters are as anticipated. Several findings are worth discussing. The following comments can be made:

(1). Demographics: Larger families have a propensity to have lower levels of per capita consumption. The results show the coefficient on household size is negative and significant at the 1% level for all the six different regressions. The impact of an additional family member is larger in rural areas (32%) than urban areas (29%). A rather surprising result is the household size squared, which is positive and significant for all the regressions. Yet this result points out that there may be economies of scale associated with larger households. As Lanjouw and

Ravallion (1995) caution against concluding that larger families tend to be poorer due to the fact that larger members allow sharing or bulk purchases which results in a lower cost per person for a given standard of living as individuals are living together than separately. Also, this result is similar to Mukherjee and Benson (2003) for their study on Malawi. Nevertheless, further research is required as to the critical value of the household size elasticity of the cost of living at which the nexus between poverty and size changes sign. The positive and significant coefficient of the age of the household head indicates that older heads increase household welfare. Squared of household head, however, is negative and significant in all except the Northern and Eastern estimations. In terms of household with female head, there is no evidence that female headed households have lower or higher consumption. Similarly the marital status of household heads shows no evidence of any influence on the level of household welfare. Also of importance is the coefficient of the ethnicity variable which suggests that on average an indigenous Fijian headed household is expected to have a higher per capita consumption in Central and Eastern divisions, and urban areas. The ethnicity coefficient is not significant for other regressions. This result complements the HIES which shows that there is a larger percentage of non-indigenous Fijian households in poverty in rural areas throughout the country. The result represents the sheer handicap of being a non-indigenous household in Western and Northern divisions and rural areas.

(2). Location: Households living in rural areas in Western and Northern Divisions have a negative coefficient and significant at 1% level, showing large differences in welfare. This is as expected because of lack of employment opportunities, infrastructure and quality services in rural areas. It is now well established that there are differences in household welfare (whether measured as consumption or income) between rural and urban areas throughout Fiji (Gounder, 2005; Deaton, 2001; United Nations Development Program, 1997; Chandra, 1980). A considerable proportion of rural households are engaged in agriculture related activities, which are likely to suffer from greater income variability, thus reducing their welfare. Essential factors affecting welfare of small farm holders in remote and rural areas arise due to lack of good roads and the distribution channels required for farmers to sell their crops.

(3). Education: The coefficient of education level of household head is positive and significant in all estimations. The results thus provide evidence that attaining higher levels of education will increase household welfare. It also shows that improvement in education is one of the most effective ways of reducing poverty. Yet reducing poverty in the short term by improving education levels will be difficult if low educational attainments are clustered among older workers. An appropriate policy in this regard would be reducing school dropouts, but this is only likely to have a long term impact on household poverty. In general, greater investment towards improving the abilities and motivations of the poor through

entire structure of education will provide opportunities to break away from the low education barriers which keep them in poverty.

(4). Electricity and housing variables: Households with access to electricity tend to have lower per capita consumption. The electricity coefficient is significant at the 1% level for all the six estimations. This could imply that households with electricity supply pay relatively high prices and thus reducing their welfare. Indeed it is recognised that electricity charges have increased significantly during the last decade. High electricity prices could also impact household welfare through its impact on prices of other goods and services. However, a fully fledged general equilibrium analysis of welfare effects is required for such an investigation. The policy challenge in this regard would be to ensure reduction in electricity prices in the long term. In terms of the housing variable, most of the results do not indicate any difference to household welfare whether the house is owned or rented by the household. The exception is the coefficient in the urban estimation which is positive, indicating that those who own houses tend to be better off.

(5). Subsistence variable: Surprisingly, the subsistence variable is not significant in any of regressions, showing that households dependent on 'home consumption' or small farming occupations' do not seem to have welfare disadvantages. The coefficient, although negative in rural area and the Northern division, is insignificant. One plausible explanation for this result is the high consumption of home grown food in these households is captured as welfare improving if more is produced and consumed. It is also important to note that for subsistence

households, a substantial fraction of income (and expenditure) comes from own farm output. As puzzling as the result may be, it is indicative of the relative advantages of being a subsistence household. Indeed research has shown in countries like Kenya that subsistence farming has the capacity to reduce rural poverty and food insecurity, and reducing rural to urban migration by supporting a vibrant agricultural economy (Nyikai, 2003).

(6). Urban – rural differences: households in rural areas in the central areas (excluded dummy in the regressions) are better off than households living other divisions. Similarly urban households in Western and Northern divisions are worse off than households in the Central division. This is not surprising as the Central division offers more economic opportunities as a large urban centre, both in terms of formal sector employment and informal sector opportunities. Another variable that is clearly at work in the two areas is the ethnicity variable. Indigenous Fijian households are likely to have higher household welfare compared to non-indigenous households in the Central and Eastern divisions while the opposite is true for the Northern division. While the ethnicity variable is significant in the urban model, it is not significant in the rural estimation. Thus the ethnicity of the household head is not important for household welfare in rural areas. The latter result also supports the notion that poverty reduction strategies should be based on means rather than on ethnic lines, the latter being the key contention for the affirmative action and social justice programmes implemented in 2001.

6. Robustness checks

How robust are the previous conclusions? The robustness of the determinants of poverty is checked by estimating a probit model. The results from probit regressions are reported in table 6. The dependent variable is *pov* (1 = poor, 0 = non poor) and the poverty line used to separate the poor from the non poor is F$8062. This is the national poverty line as established by the HIES. Since being a poor household = 1, a positive coefficient of the independent variable indicates an increase in the probability of being in consumption poverty. By and large the results from the probit estimations support the results of the OLS estimations. Comparisons of the results with the OLS regressions are as follows:

(1). Demographics: Household size is consistent with the OLS estimates. The coefficient is positive and significant, indicating that larger households have greater probability of being in poverty. While the variable household size squared is negative and in line with the OLS estimates, it is only significant for one of the specifications (urban households). In the OLS regression age of the household head and its squared is significant only in the urban household model. Results from the probit regressions show that both the variables are significant in the central and Western division, and urban estimations. Sex and marital status of household head is once again not significant for any of the estimations. The ethnicity of household head is now significant in only the urban regression with consistent interpretation.

Table 6: Results from Probit regressions

Variable	Central	Western	Northern	Eastern	Rural	Urban
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
	(*z*-Statistic)	(*z*-Statistic)	(*z*-Statistic)	(*z*-Statistic)	(*z*-Statistic)	(*z*-Statistic)
eduattain_head	-0.050	-0.073	-0.023	-0.042	-0.059	-0.053
	(-10.25)***	(-11.32)***	(-3.19)***	(-2.60)***	(-9.69)***	(-11.99)***
area	-0.05	0.481	0.606	-0.310	-	-
	(-0.64)	(7.57)***	(4.81)***	(-0.98)	-	-
age_head	-0.034	-0.047	-0.019	-0.05	-0.020	-0.050
	(-2.80)***	(-3.85)***	(-1.03)	(-1.40)	(-1.79)*	(-4.91)***
age_head^2	0.0002	0.0003	0.0002	0.0005	0.0001	0.0004
	(2.03)**	(2.46)**	(-3.19)***	(1.34)	(0.77)	(3.98)***
hhold_size	-0.249	-0.192	-0.193	-0.250	-0.184	-0.239
	(-5.32)***	(-3.49)***	(-2.52)**	(-1.79)*	(-3.78)***	(-5.88)***
$hhold\_size^2$	0.008	0.004	0.004	0.009	0.003	0.008
	(2.39)**	(1.04)	(0.72)	(0.79)	(1.00)	(2.49)**
sex_head	-0.018	0.065	0.150	0.087	0.136	-0.014
	(-0.21)	(0.69)	(0.94)	(0.31)	(1.48)	(-0.19)
subsistence	-0.072	0.046	-0.043	-0.213	-0.028	-0.006
	(-1.07)	(0.73)	(-0.39)	(-1.09)	(-0.46)	(-0.11)

electricity	0.860	0.447	0.538	0.396	0.341	0.239
	(9.62)***	(4.60)***	(4.54)***	(2.21)**	(5.12)***	(12.04)***
hethnic_head	-0.088	-0.055	0.054	-0.27	-0.008	-0.078
	(-1.61)	(-0.96)	(0.61)	(-1.14)	(-0.13)	(-1.79)*
mstatus_head	0.083	-0.037	-0.073	0.029	-0.051	0.044
	(1.07)	(-0.46)	(-0.55)	(0.13)	(-0.66)	(0.67)
housing	-0.560	0.033	0.036	0.005	0.140	-0.281
	(5.73)***	(0.34)	(0.28)	(0.02)	(1.63)	(3.74)***
eastern	-	-	-	-	0.105	0.526
	-	-	-	-	(0.990)	(1.90)*
western	-	-	-	-	0.652	0.286
	-	-	-	-	(8.19)***	(4.99)***
northern	-	-	-	-	0.814	0.123
	-	-	-	-	(8.71)***	(1.90)*
constant	1.686	2.901	1.409	2.799	1.84	2.07
	(5.11)***	(8.72)***	(2.94)***	(2.76)***	(5.74)***	(7.65)***
McFadden R^2	0.14	0.14	0.09	0.07	0.13	0.14
Households	2164	1992	794	267	2230	2987

Notes: *z* statistics are in parenthesis; (***), (**) and (*) denote significance at the 1%, 5% and 10% levels respectively; dependent variable is *pov* (1 = poor, 0 = non poor); the poverty line used to separate the poor from the non poor is F$8062.

(2). Location: In line with the OLS results, *area* variable is significant in the Western and Northern division estimations. This confirms that rural households have greater probability of being poor in these divisions.

(3). Education: The coefficient of education is once again significant at the 1% level and has the expected negative sign in all regressions, confirming that education has a strong impact on poverty.

(4). Electricity and housing variables: The coefficient of electricity variable supports the results of the OLS model. It is significant in all regressions and shows that households with electricity supply have a greater probability of being in poverty. The coefficient of housing is significant for urban area and the Central division, the latter being insignificant in the OLS estimation.

(5). Subsistence variable: Consistent with OLS estimates, subsistence is not significant in any of the estimations. So even with the probit estimations, it is difficult to support the conventional notion that subsistence households are more exposed to being in poverty.

(6). Urban – rural differences: Similar to OLS results, rural and urban households in the Central division are better off than households in other divisions of the country. The ethnicity variable is once again significant in the urban sample.

7. Concluding Remarks

Growth in real GDP in the last 30 years has unquestionably been insufficient to lift living standards. Rural urban migration has occurred at unprecedented levels augmented by the land tenure systems and lethargic rural economies (Gounder, 2005). Hundreds of skilled personnel abandon the country each year, causing loss of much needed human capital required to maintain productivity and long term growth prospects. While the economic liberalization of the late 1980s sustained, at least for a decade, an increase in employment and exports, the gradual loss of Generalized System of Preferences (GSP) for primary exports has reduced many of the industries on the brink of collapse. As a result of these economic disturbances, poverty is now both more persistent and widespread. Against this backdrop, this paper examined the determinants of household poverty in Fiji using 2002-2003 HIES.

Education, demographics, and location have emerged as important determinants of household consumption and poverty. These results have important policy implications for design and implementation of poverty reduction policies. For instance, education and training of the labour force should be a key priority area in the struggle against poverty. Second, in addition to rural infrastructure, the government must also enhance the employment and livelihood opportunities in the rural sector. The robustness of the relationships between various characteristics and household poverty was tested using an alternative approach. The results are very robust to a different empirical approach. Having noted that, supplementary poverty reduction policies at the macroeconomic level

would entail issues dealing with promoting investment, political stability, income security and economic growth. As agriculture remains a major source of income and employment in rural areas, agricultural growth also remains crucial for poverty reduction.

References

Barr, K. J. (2007). Fiji's Current Poverty Situation. *Fijian Studies: A Journal of Contemporary Fiji*, 5 (2), 205-208.

Bryant, J. J. (1992). Poverty in Fiji: Who are the Urban Poor? *Singapore Journal of Tropical Geography*, 13 (2), 90-102.

Central Planning Office, (1985), 'Fiji's Ninth Development Plan: 1986-1990' (Suva, Fiji: Central Planning Office, Government of Fiji).

Chand, S. (2007). 50/50 by 2020: poverty and redistributive politics in post-independence Fiji. *Pacific Economic Bulletin*, 22 (2), 22-35.

Fuwa, N. (2000). The poverty and heterogeneity among female-headed households revisited: The case of Panama. *World Development*, 28 (8), 1515-1542.

Gounder, N. (2005). Rural Urban Migration in Fiji: Causes and Consequences. Working Paper No. 2005/12, School of Economics, University of the South Pacific, Suva, Fiji.

Government of Fiji, (1997), 'Fiji Poverty Report' (Suva, Fiji: Government of Fiji).

Hill, R. C., Griffiths, W. E. and Lim, G. C. (2008). *Principles of Econometrics*. USA: John Wiley & Sons.

Lanjouw, P. and Ravallion, M. (1995). Poverty and Household Size. *The Economic Journal*, 105, 1415-1434.

Mallick, D. and Rafi, M. (2009). Are Female-Headed Households More Food Insecure? Evidence from Bangladesh. *World Development*, 38 (4), 593-605.

Mukherjee, S. and Benson, T. (2003). The Determinants of Poverty in Malawi, 1998. *World Development*, 31 (2), 339-358.

Narsey, W. 2008. *The Quantitative Analysis of Poverty in Fiji*. Vanuavou Publications, Suva.

Ravallion, M. (1992). Poverty comparisons: a guide to concepts and methods. (Washington DC, World Bank).

Silva, I. D. (2008). Micro-level determinants of poverty reduction in Sri Lanka: a multivariate approach. *International Journal of Social Economics*, 35 (3), 140-158.

Stavenuiter, S. 1983. Income Distribution in Fiji. (Suva, Fiji: Central Planning Office, Government of Fiji).

Strategic Development Plan 2003-2005, (2002) 'Rebuilding Confidence for Stability and Growth for a Peaceful, Prosperous Fiji,' Parliamentary Paper No. 72 of 2002, (Suva, Fiji: Government of Fiji).

United Nations Development Programme, 1997, 'Sustaining Livelihoods: Promoting Informal Sector Growth in Pacific Island Countries' (Suva: United Nations Development Programme).