



Working Papers in Trade and Development

Vulnerability to poverty in Papua New Guinea

Raghendra Jha
and
Tu Dang

August 2008
Working Paper No. 2008/08

The Arndt-Corden Division of Economics
Research School of Pacific and Asian Studies
ANU College of Asia and the Pacific

Vulnerability to poverty in Papua New Guinea

Raghendra Jha

And

Tu Dang

The Arndt-Corden Division of Economics
Research School of Pacific and Asian Studies
College of Asia and the Pacific
The Australian National University

Corresponding Address :

Raghendra Jha
Australia South Asia Research Centre
The Arndt-Corden Division of Economics
Research School of Pacific & Asian Studies
College of Asia and the Pacific
The Australian National University
Email: R.Jha@anu.edu.au

August 2008
Working paper No. 2008/08

This Working Paper series provides a vehicle for preliminary circulation of research results in the fields of economic development and international trade. The series is intended to stimulate discussion and critical comment. Staff and visitors in any part of the Australian National University are encouraged to contribute. To facilitate prompt distribution, papers are screened, but not formally refereed.

Copies may be obtained from WWW Site
<http://rspas.anu.edu.au/economics/publications.php>

Vulnerability to poverty in Papua New Guinea^{*}

Raghendra Jha, Tu Dang

The Arndt-Corden Division of Economics,

RSPAS, College of Asia and the Pacific, ANU

Abstract

In the extant literature either income or consumption expenditures as measured over short periods of time has been regarded as proxies for the material well-being of households. However, economists have long recognized that a household's sense of well-being depends not just on its average income or expenditures, but also on the risks it faces. Hence vulnerability is a more satisfactory measure of welfare. In this study we measure the extent of vulnerability as expected poverty and examine the importance of its determinants on the basis of an analysis of household survey data for Papua New Guinea (PNG). We find that in PNG, vulnerability and poverty are largely rural phenomena. Moreover, the distribution of vulnerability across different segments of the population can differ significantly from the distribution of poverty. In addition, there is a sizable fraction of the population of PNG who were observed to be non-poor but are estimated to be vulnerable to poverty. Thus, poverty reduction strategies in PNG need to incorporate not just alleviation efforts but also prevention.

Keywords: Poverty, Vulnerability, Cross-section data, PNG

JEL codes: C21, C23, I32

^{*} We are grateful to IFAD for financial support and to Raghav Gaiha and Katsushi Imai for comments. The usual disclaimer applies.

I. Introduction

In the extant literature either income or consumption expenditures, as measured over short periods of time (say a year), has been regarded as proxies for the material well-being of households. However, economists have long recognized that a household's sense of well-being depends not just on its average income or expenditures, but also on the risks it faces. Hence vulnerability is a more satisfactory measure of welfare. The concept of vulnerability used extends the notion of poverty to include idiosyncratic as well as system-wide (covariate) risks. If policymakers design poverty alleviation policies in the current year on the basis of a poverty threshold of income in the previous year, "the poor" who receive income support may have already escaped from poverty and "the non-poor" who do not receive income may have slipped into poverty due to various unanticipated shocks (e.g. changes in relative crop prices or an illness incapacitating the main bread winner).

Chaudhuri (2003) listed four reasons why we should be concerned about vulnerability:

- A temporal or static approach to well-being, like poverty assessment, is of limited use in thinking about policy interventions to improve well-being that can only occur in the future.
- Vulnerability assessment highlights the distinction between ex-ante poverty prevention interventions and ex-post poverty alleviation interventions.
- Analysing vulnerability helps to investigate sources and forms of risks households face. This helps to design appropriate safety net programs to reduce or mitigate risk, hence vulnerability.
- Vulnerability is an intrinsic aspect of well-being under the assumption that individuals are risk averse.

According to Holzmann and Jørgensen (2001), poverty and vulnerability are closely related concepts due to two established facts: (i) the poor are typically most exposed to diverse risks, and (ii) the poor have the fewest instruments to deal with these risks. Thus, Chaudhuri et al. (2002) state that:

“Poverty and vulnerability (to poverty) are two sides of the same coin.... So if we are able to generate predicted probabilities of poverty for households with different sets of characteristics (which some but not all poverty assessments attempt), we will have, in effect, estimates of the vulnerability of these households.” (p. 3)

The purpose of this paper is to analyse poverty and vulnerability in Papua New Guinea (PNG). The paper begins in Section II by discussing the concept of social risk management and vulnerability. Section III lays out strategies to measure vulnerability for cross-section data. Section IV briefly introduces the economic and poverty situation in PNG. Section V discusses the data used in our analysis. Section VI estimates determinants of vulnerability to poverty in PNG. Section VII conducts a profile of vulnerability for PNG. Section VIII concludes the paper. To the best of our knowledge, this is the first analysis of vulnerability for PNG.

II. Social risk management and vulnerability

Globalization leads to improvements in welfare all over but also increase in income variability. Thus, according to Holzmann and Jørgensen (1999), social risk management (SRM) is concerned about four main issues:

- *Vulnerability*: can be defined as the risk of an individuals or a households to fall below the poverty line or, for those already below the poverty line, to remain in or to fall further into poverty. Anti-vulnerability policies are designed to prevent this risk. Meanwhile, traditionally, anti-poverty policy is only concerned with bringing the poor up to the poverty line. Enhancing the static anti-poverty concept with the dynamic vulnerability concept through risk management measures should prove to be welfare enhancing.
- *Consumption smoothing*: Individuals are presumed to prefer spreading the expected income over a long period (i.e., they are risk-averse). This requires appropriate risk management instruments, such as saving and dis-saving possibilities, in order to smooth consumption path.
- *Improved equity*: Improved equality eases constraints in the ability of the poor to smooth their consumption, resulting in a better risk management (Holzmann and Jørgensen, 2001)

- *Economic development*: Undoubtedly, economic development is an important factor in reducing poverty.

Among the above issues, vulnerability is the central concept of SRM (Holzmann et al., 2003). Holzmann et al. (2003) review *three* definitions of vulnerability:

1. Vulnerability is the risk that a household will, if currently non-poor, fall below the poverty line, or if currently poor, will remain in poverty or fall deeper into poverty. Thus, vulnerability is synonymous with a high probability of becoming poor or poorer in the future. This definition is referred as *outcome approach* to vulnerability in Scaramozzino (2006).
2. Vulnerability is the households' ability to smooth (insure) consumption when faced income shocks while preserving a minimum level of assets. Under this approach, vulnerability is tantamount to consumption volatility. More precisely, household vulnerability is the conditional covariance between changes in household consumption and changes in income, subject to an asset constraint.
3. Vulnerability is the utility lost due to risks, as the difference between the expected household consumption and the certainty-equivalent consumption. This definition is referred as *utility-based approach* to vulnerability in Scaramozzino (2006). Especially, the utility function can be decomposed into two distinct components measuring vulnerability: poverty and risk (aggregate and idiosyncratic risk) (Ligon and Schechterd, 2003).

III. Empirical strategy toward measuring vulnerability

This section discusses econometric methods for vulnerability assessments corresponding to the first definition of vulnerability – outcome approach. Ideally, according to Holzmann et al. (2003), the implementation of vulnerability assessment requires panel data, and information on (i) the shocks that affect the households, and (ii) the household ability to withstand those shocks. Such data are typically not available, especially in developing countries. However, cross-sectional data have

been advised to estimate vulnerability, namely *vulnerability as expected poverty* (VEP), as a second-best solution (Chaudhuri, 2003; Chaudhuri et al., 2002).

With VEP, the vulnerability level of household (or individual) i at time t is defined by

$$VEP_t^i = \Pr(c_{t+1}^i \leq z)$$

where c_{t+1}^i is the per capita consumption (or income) of household i at time $t + 1$ and z is the per capital expenditure requirement defined as the poverty line. If we can estimate the ex ante probability distribution f of the consumption c , the vulnerability of household i can be identified as

$$VEP_t^i = \int_0^z f(c_{t+1}^i) dc_{t+1}^i$$

Here, we assume a stationary environment where the probability of possible future consumption outcomes remain the same across time (Ligon and Schechter, 2004).

The major challenge in measuring vulnerability is to estimate the probability distribution f (Christiaensen and Boisvert, 2002). Given a limited panel data set for two years, in the case of Tajikistan, we assume that consumption is log-normally distributed as in Chaudhuri et al. (2002).^{*} Thus, vulnerability is estimated by

$$VEP_t^i = \Phi\left(\frac{\ln z - \ln c_{t+1}^i}{\sigma_i}\right)$$

with Φ is the cumulative log-normal distribution function.

Thus, to estimate a household's vulnerability we need to estimate its expected consumption and the variance of its consumption. To predict the consumption of

^{*} With a panel data of sufficient length we can directly estimate the probability distribution of the household's consumption without the need for auxiliary assumptions.

household i at time $t+1$ and the variance of consumption σ_i^2 we specify the following heteroscedasticity regressions:

$$\ln c^i = X_i\beta + \varepsilon_i \quad (1)$$

$$\sigma_{\varepsilon_i}^2 = X_i\theta + e_i \quad (2)$$

where X_i presents a bundle of observed house household characteristics, such as the number of household members or the proportion of children.

According to Chaudhuri et al. (2002), there are two vulnerability thresholds. The first is the observed current poverty rate in the population. The alternative threshold is 0.5. This threshold indicates that a household whose vulnerability level exceeds 50 percent is more likely than not to end up being poor and can thus be considered to be vulnerable. In this paper, in conformity with extant practice we chose the later threshold so a household i would be included among the vulnerable if $VEP^i > 0.5$.

IV. Economic and poverty situation in PNG

PNG is a poor country among the Pacific island countries with GDP per capita much lower than that of Fiji, Samoa, Tonga and Vanuatu (Figure 1). PNG's recent growth rate has been around the average growth rate of the Pacific island countries (Figure 2). Inflation was remarkably high in PNG from 1998 to 2003, and stabilised just recently (Figure 3). The high inflation rate in Papua New Guinea reflects high budget deficits, which began to get narrowed in 2001 (ESCAP, 2004).

[Figures 1, 2, 3 here]

The agriculture sector accounted for the largest share of GDP in PNG, followed by industry and the service sector (Table 1). The experience of many Asian countries indicates that one of the important factors responsible for poverty reduction is high economic growth, which PNG has not had so far.

[Table 1 here]

Despite poor economic performance, some social indicators of this country have been improving moderately PNG (Table 1). For instance, life expectancy improved from 56.8 years in 2000 to 57.3 years in 2006. Infant mortality rates declined to 54.4 deaths per 1,000 live births in 2006, compared with 59.5 in 2000. The Gini index is low at only 30.3 which is better than that for many developed countries (UNDP, 2007).

V. Data

The data for PNG are from the 1996 Papua New Guinea Household Survey (PNGHS96) which is the first and, to the best of our knowledge the only available, national study of consumption, living standard and poverty in PNG. The survey used a stratified, two-stage random sample of 1200 households (but for only 1144 households do we have complete information) residing in 120 Census Units that were selected from the 1990 Census sample frame (Gibson, 2000). The survey represents four regions: Highlands, Islands, Momase, and Papua (including Nation Capital District). Table 2 summarizes the basic statistics of the sample.

[Table 2 here.]

For 1996, the poverty line is not available but the poverty rate of 37.5% (PNG: Poverty Assessment - WB 2004) is. Hence, the poverty line can be estimated from the sample. PNGHS96 provides sampling weights.

VI. Determinants of vulnerability in PNG

Based on the specification described in Section III, we estimated the coefficients on the different determinants of the ex ante mean and variance of future consumption as specified by (1) and (2). The estimated results, i.e. the relative importance of different factors to vulnerability, are presented in Table 3.

[Table 3 here]

Households in Highland, Island and Momase regions tend to have lower expectation of future consumption (per capita) than households in Papua. However, there is less significant evidence that households in Highland and Momase have larger

variances of consumption than the other regions. Thus we can say that households in Highland and Momase are comparatively more vulnerable to poverty.

Controlling for all other determinants, large household size significantly reduces expectation of consumption, thereby increasing household vulnerability. It is well-known that families with many children are on average poorer. However, this negative effect weakens with the household size because the coefficient on (average) household size squared is positive and significant. We also find significant evidence that in PNG larger household size is associated with a decrease in the variance of consumption. This negative effect also weakens with the household size. We don't find any significant evidence that age and gender of household heads are associated with mean and variance of future consumption.

In general, there is significant association between the dependency ratio in a household and the expectation and variance of the household consumption. The larger the household size the greater is its vulnerability, as manifested by a significantly lower expectation of future consumption. The dependency ratio is measured as the proportion of the household under the age of 15.

VII. Profile of vulnerability in PNG

a. Distribution of vulnerability at the aggregate level

Based on the estimation results for determinants of vulnerability above we conduct a vulnerability profile for PNG. Using the crucial assumption that income is lognormally distributed we can calculate the probability that a household has a per capita income falling below the poverty line in the future. A household (or a person) is then considered as vulnerable to poverty if this probability exceeds some threshold.

To investigate the distribution of the vulnerability we chose a threshold of 0.5 for the reason that a household whose vulnerability level exceeds 0.5 is more likely than not to end up poor (Chaudhuri, 2003; Chaudhuri et al., 2002).

Table 4 describes the distribution of vulnerability at the aggregate level in PNG. It can be seen that, in this case, the poverty rate overestimates the fraction of the

population vulnerable to poverty. While 37.5% of the population is observed to be poor, we estimate only 34.1% of the population is vulnerable to poverty.

[Table 4 here.]

Table 4 also shows that there a sizable fraction of non-poor are vulnerable to poverty. Indeed, of the 62.6% of the population observed to be non-poor, 15.7% are estimated to be vulnerable to poverty. Thus poverty reduction strategies need to incorporate not just alleviation efforts but also prevention. Of course, programs that aim to reduce the vulnerability in the population need to be targeted differently from those aimed at poverty alleviation. This can be seen in the next subsection, where we analyse the distribution of vulnerability to poverty over segments of the population.

To check for other vulnerability threshold, Figure 4 depicts the estimated incidence of vulnerability to poverty for the population, the poor and the non-poor for given vulnerability thresholds - ranging from 0 to 1 – measured along the horizontal axis. The horizontal line illustrates the (observed) poverty rate of the population. The figure shows that for any threshold less than 0.5 the vulnerability rate of the population is higher than the poverty rate. Figure 4 also suggests that for almost any threshold, the incidence of vulnerability to poverty of the population across the poor and the non-poor are significantly different and a positive fraction of the non-poor is vulnerable to poverty. The vulnerable fraction of the non-poor is much closer to the vulnerable fraction of the population than the vulnerable fraction of the poor. This implies that the incidence of vulnerability of the poor is much higher than that of the overall population. This is in line with the argument of Chaudhuri et al. (2002) that “poverty and vulnerability are closely related concepts”.

[Figure 4 here.]

b. Distribution of vulnerability over selected segments

We now analyse the distribution of vulnerability (along with poverty) over locations and selected household characteristics (see Table 5).

[Table 5 here]

In Table 5 reports on the imbalances in the contribution of various areas and household characteristics to overall poverty and vulnerability. The observed poverty rates underestimated the vulnerability to poverty only in Island and Momase and overestimated the vulnerability in Highlands and Papua. We also find that in PNG inter-regional differences in vulnerability rates are more obvious than the regional disparities in poverty rates. Indeed, the fraction of population poor that is poor ranges from a low of 14.8% in Papua to a high of 67.5% in Momase. However, the fraction of population vulnerable to poverty ranges from a low of only 9.5% in Papua to a high of 67.8% in Momase. One reason for the high poverty and vulnerability rates in Momase is the high incidence of inequality (Figure 5).

[Figure 5 here]

The reason for the imbalance in the contribution of the divisions in PNG to overall poverty and vulnerability is their small size, remoteness and geographical fragmentation. Because of this, the divisions suffer disproportionately from external shocks, such as natural disasters, and are vulnerable to poverty differently.

Clearly, poverty and vulnerability increase with household size. For instance, of the 2.3% of the population which lives in households with 2 members, the latter accounting for 4% of the poor and 0.8% of the vulnerable, 23.1% are poor and 12.3% are vulnerable to poverty. Meanwhile, of the 64.2% of the population living in households with 6 or more members and more, the latter accounting for 66.9% of the poor and 69.4 of the vulnerable, 39% are poor and 36.9% are vulnerable to poverty.

We don't find any pattern of the distribution of poverty and vulnerability over gender of household head.

In general, people who live in households headed by individuals having lower education are poorer and more vulnerable to poverty. For example, of the 37.5% of the population that lives in households headed by individuals with no grade, the latter accounting for 56.7% of the poor and 62.8% of the vulnerable, about 56.7% are poor and 57.1% are vulnerable to poverty. Meanwhile, of the 13.5% of the population that lives in households headed by individuals with certificate level education only 5.6%

are vulnerable to poverty. In particular no household headed by individuals with diploma, bachelor's degree and postgraduate is poor or vulnerable to poverty.

VIII. Conclusions

We found that in PNG, vulnerability (and poverty) are significantly different across different regions of the country. Policies to reduce inequality both within and across regions are recommended. An important policy measure would be to improve transport and social infrastructure to make opportunities available to those living in poor regions. The construction of roads would provide access to markets, health, education and other services. In particular we find that no household headed by individuals with diploma or higher is observed to be poor or to be vulnerable to poverty. This means that for the poor to participate fully in economic activities, they need to be provided with improved access to education.

We also found that the fraction of the population that faces a risk of poverty is considerably different from the fraction that is observed to be poor. Thus, poverty reduction strategies in PNG need to incorporate not just alleviation efforts but also prevention. There is a sizable fraction of the population in PNG who were observed to be non-poor but are estimated to be vulnerable to poverty. Moreover, the distribution of vulnerability across different segments of the population can differ significantly from the distribution of poverty. Therefore, programs that aim to reduce the vulnerability in the population need to be targeted differently from those aimed at poverty alleviation.

Table 1: Selected economic and social indicators for PNG, 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Inflation, consumer prices (annual %)	4.0	13.6	14.9	15.6	9.3	11.8	14.7
GDP growth (annual %)	-3.9	-3.8	7.5	-1.2	-0.1	-0.2	2.2
GDP per capita (constant 2000 US\$)	673	631	660	636	619	602	601
Agriculture, value added (% of GDP)	28.4	34.7	41.0	42.0	41.8	..	..
Industry, value added (% of GDP)	44.0	38.8	37.7	38.3	39.1	..	..
Services, etc., value added (% of GDP)	27.7	26.5	21.3	19.7	19.0	..	..
Poverty rate (% of population)	37.5 ^{(1996)*}	..	..	..	..	..	..
Gini index	52.9 ^{(1996)**}	..	..	..	..	..	..
Life expectancy at birth, total (years)	56.8	..	56.9	..	..	57.2	57.3
Infant mortality rate (per 1,000 live births)	59.5	..	..	..	..	55.2	54.4
Population growth (annual %)	2.6	2.5	2.5	2.4	2.3	2.2	2.2

Source: World Development Indicators, World Bank. * PNG Poverty Assessment – WB 2004. ** Our estimate

Table 2: Basic Characteristics of PNG Sample

Variable	Obs.	Mean	Std. Dev.	Min	Max
Household consumption per year per capita (kina)	1144	1239	1829.51	48	20568
Household size	1144	6	3.27	1	24
Age of household head	1144	40	12.18	16	85
Highest education qual. of hh head (schooling years)	1144	5	5.41	0	17
No of children (≤ 15)	1144	3	1.96	0	11
No of old (≥ 55)	1144	0.3	0.648	0	5

Table 3: Determinants of vulnerability in PNG

	log household consumption per capita	
	expectation	variance
Whether household in		
Highlands	-0.119**	0.116**
Island	-0.507***	-0.076
Momase	-0.712***	0.126**
Household size	-0.164***	-0.053**
Household size squared	0.005***	0.002*
Whether hh head is male	-0.101	-0.002
Age of hh head	0.003	0.002
Highest educational qualification completed by hh	0.042***	0.008**
Prop. of child (<=14)	-0.612***	-0.093
Prop. of old (>=55)	-0.152	-0.230*
Whether hh owns agriculture capital goods	0.057	-0.076*
Log of total current value of durables	0.181***	0.004
Constant	6.877***	0.502***
Number of obs.	1144	1144
R-squared	0.6103	0.03021

Table 4: Cross-distribution between poverty and vulnerability in PNG

	Non-vulnerable	Vulnerable	
Non-poor	84.3	15.7	62.6
Poor	35.2	64.8	37.5
Overall	65.9	34.1	100

Table 5: Distribution of poverty and vulnerability in PNG

	Share of population	Share of poor	Share of vulnerable	Poverty rate	Vulnerability rate
By regions					
Highlands	34.0	35.9	34.5	39.5	34.6
Island	8.3	9.0	10.2	40.9	42.0
Momase	22.9	41.3	45.6	67.5	67.8
Papua	34.8	13.8	9.7	14.8	9.5
By household size					
1 member	0.5	0.1	0.1	11.1	7.4
2 members	2.3	1.4	0.8	23.1	12.3
3 members	7.3	6.2	5.0	31.9	23.7
4 members	11.8	10.7	10.1	34.1	29.3
5 members	14.0	14.6	14.5	39.1	35.3
6 members +	64.2	66.9	69.4	39.0	36.9
By gender of household head					
Female	7.1	7.5	7.5	39.4	35.9
Male	92.9	92.5	92.5	37.3	33.9
By qualification of household head					
No grade	37.5	56.7	62.8	56.7	57.1
1-12 years schooling	43.7	37.7	34.9	32.3	27.2
Certificate	13.5	5.6	2.3	15.6	5.8
Diploma	1.4	0.0	0.0	0.0	0.0
Bachelor's degree	3.4	0.0	0.0	0.0	0.0
Postgraduate	0.5	0.0	0.0	0.0	0.0

Figure 1: GDP per capita in selected Pacific island economies, 1997-2006 (Source: World Development Indicators, WB)

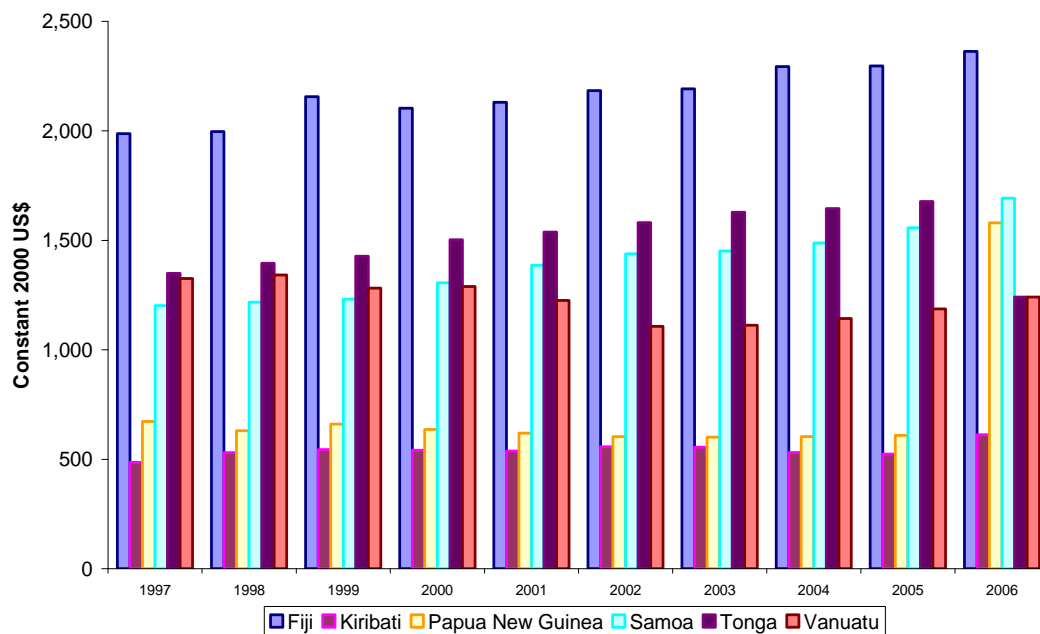


Figure 2: Rates of GDP growth in selected Pacific island economies, 1997-2006 (Source: World Development Indicators, WB)

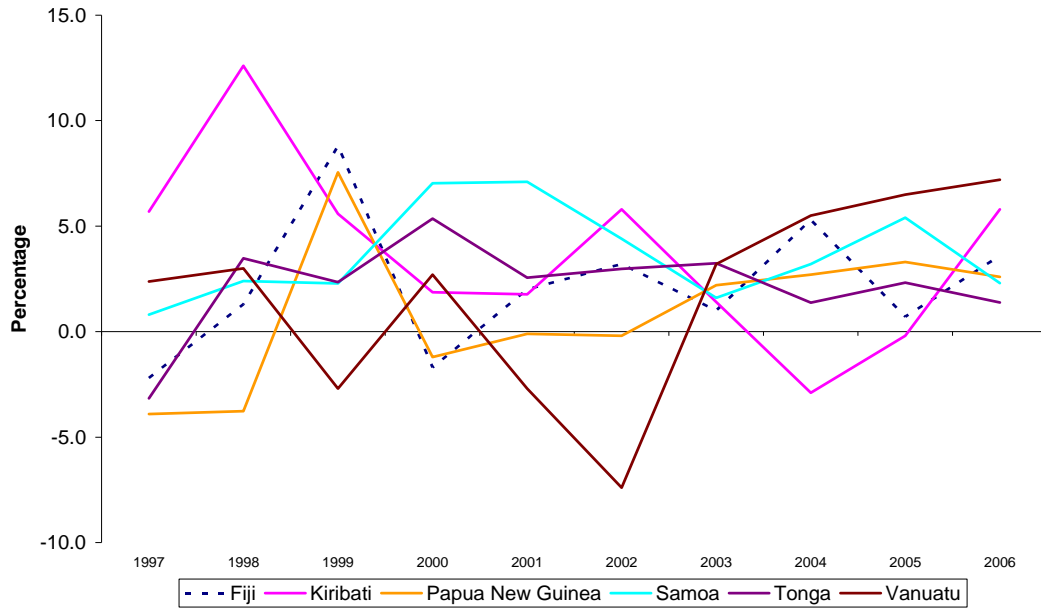


Figure 3: Inflation rates in selected Pacific island economies, 1997-2006 (Source: World Development Indicators, WB)

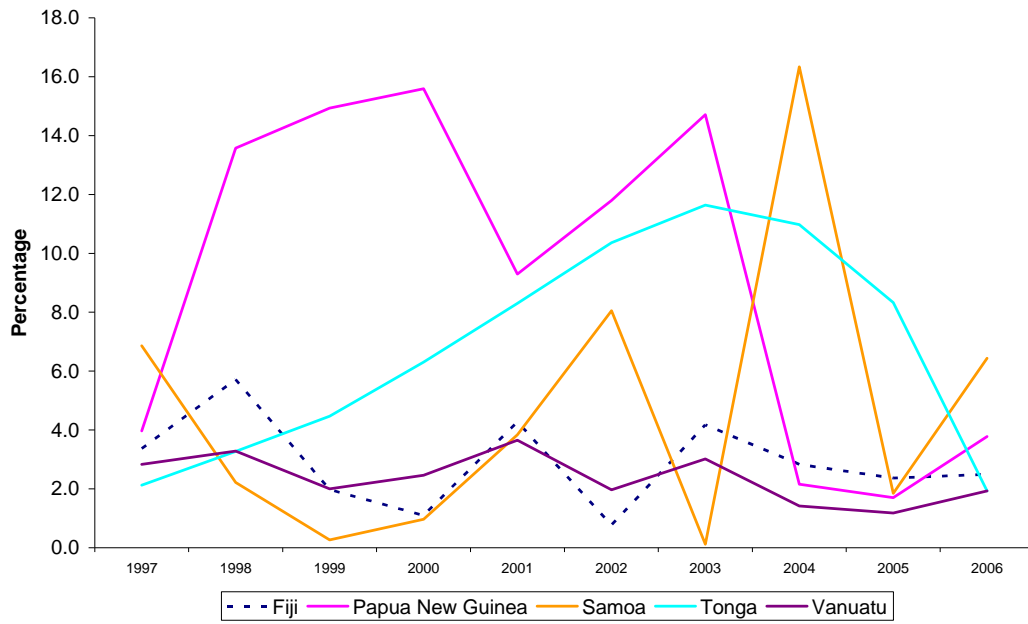


Figure 4: Estimated incidences of vulnerability to poverty for poor and non-poor in PNG

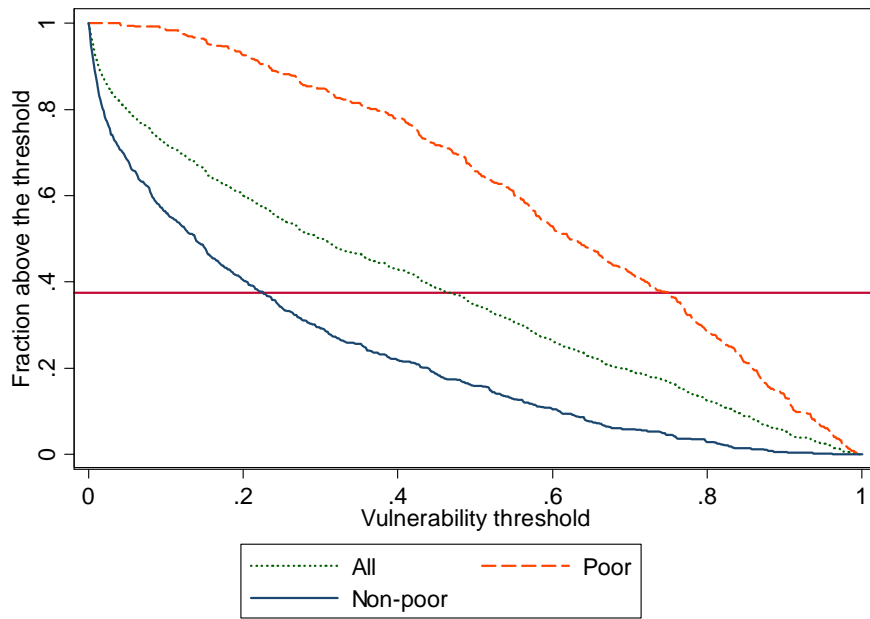
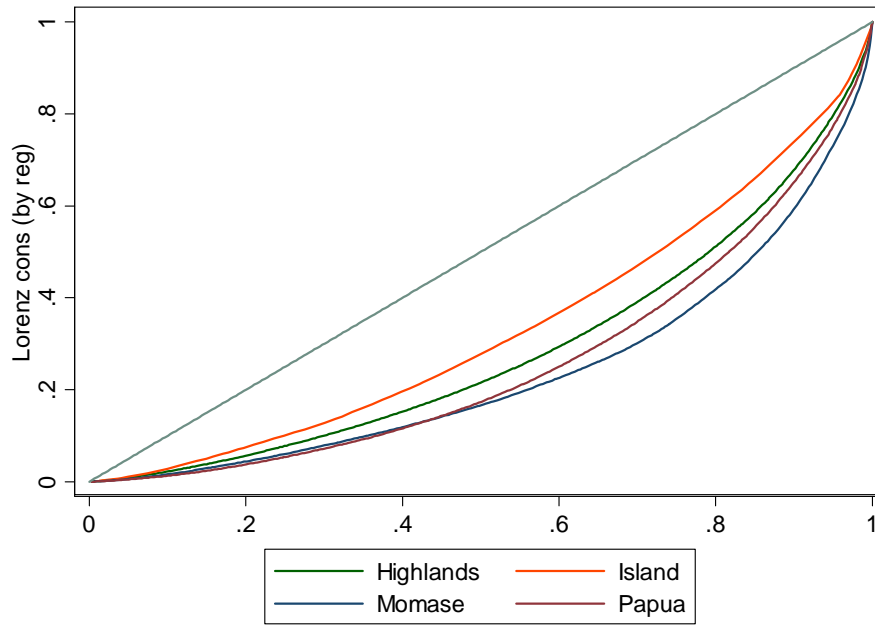


Figure 5: Lorenz curves by regions in PNG



References

- Chaudhuri, S., 2003, Assessing vulnerability to poverty: concepts, empirical methods and illustrative examples.
- Chaudhuri, S., J. Jalan, and A. Suryahadi, 2002, Assessing household vulnerability to poverty from cross-sectional data: A methodology and estimates from Indonesia: Economics Department Discussion Papers, v. 0102-52.
- Christiaensen, L. J., and R. N. Boisvert, 2002, On Measuring Household Food Vulnerability: Case Evidence from Northern Mali, Working Paper, Cornell University.
- ESCAP, 2004, Economic and Social Survey of Asia and the Pacific 2004, United Nations.
- Gibson, J., 2000, The Papua New Guinea Household Survey: The Australian Economic Review, v. 33, p. 377-80.
- Holzmann, R., and S. Jørgensen, 1999, Social Risk Management: Conceptual Underpinnings for the Social Protection Sector Strategy Paper, Social Protection Discussion Paper Series, The World Bank, p. 529-556.
- Holzmann, R., and S. Jørgensen, 2001, Social Risk Management: A New Conceptual Framework for Social Protection, and Beyond: International Tax and Public Finance, v. 8, p. 529-556.
- Holzmann, R., L. Sherburne-Benz, and E. Tesliuc, 2003, Social risk management: The World Bank's approach to social protection in a globalizing world, Washington, D.C., The World Bank.
- Ligon, E., and L. Schechter, 2004, Evaluating Different Approaches to Estimating Vulnerability, Social Protection Discussion Paper, The World Bank.
- Ligon, E., and L. Schechter, 2003, Measuring Vulnerability: The Economic Journal, v. 113.
- Scaramozzino, P., 2006, Measuring Vulnerability to Food Insecurity, ESA Working Paper.
- UNDP, 2007, Human Development Report 2007/2008, New York, United Nations Development Programme.

Working Papers in Trade and Development
List of Papers (including publication details as at 2008)

- 99/1 K K TANG, 'Property Markets and Policies in an Intertemporal General Equilibrium Model'.
- 99/2 HARYO ASWICAHYONO and HAL HILL, 'Perspiration' v/s 'Inspiration' in Asian Industrialization: Indonesia Before the Crisis'.
- 99/3 PETER G WARR, 'What Happened to Thailand?'.
- 99/4 DOMINIC WILSON, 'A Two-Sector Model of Trade and Growth'.
- 99/5 HAL HILL, 'Indonesia: The Strange and Sudden Death of a Tiger Economy'.
- 99/6 PREMA-CHANDRA ATHUKORALA and PETER G WARR, 'Vulnerability to a Currency Crisis: Lessons from the Asian Experience'.
- 99/7 PREMA-CHANDRA ATHUKORALA and SARATH RAJAPATIRANA, 'Liberalization and Industrial Transformation: Lessons from the Sri Lankan Experience'.
- 99/8 TUBAGUS FERIDHANUSETYAWAN, 'The Social Impact of the Indonesian Economic Crisis: What Do We Know?'.
- 99/9 KELLY BIRD, 'Leading Firm Turnover in an Industrializing Economy: The Case of Indonesia'.
- 99/10 PREMA-CHANDRA ATHUKORALA, 'Agricultural Trade Liberalization in South Asia: From the Uruguay Round to the Millennium Round'.
- 99/11 ARMIDA S ALISJAHBANA, 'Does Demand for Children's Schooling Quantity and Quality in Indonesia Differ across Expenditure Classes?'.
- 99/12 PREMA-CHANDRA ATHUKORALA, 'Manufactured Exports and Terms of Trade of Developing Countries: Evidence from Sri Lanka'.
- 00/01 HSIAO-CHUAN CHANG, 'Wage Differential, Trade, Productivity Growth and Education'.
- 00/02 PETER G WARR, 'Targeting Poverty'.
- 00/03 XIAOQIN FAN and PETER G WARR, 'Foreign Investment, Spillover Effects and the Technology Gap: Evidence from China'.
- 00/04 PETER G WARR, 'Macroeconomic Origins of the Korean Crisis'.
- 00/05 CHINNA A KANNAPIRAN, 'Inflation Targeting Policy in PNG: An Econometric Model Analysis'.
- 00/06 PREMA-CHANDRA ATHUKORALA, 'Capital Account Regimes, Crisis and Adjustment in Malaysia'.

- 00/07 CHANGMO AHN, 'The Monetary Policy in Australia: Inflation Targeting and Policy Reaction.'
- 00/08 PREMA-CHANDRA ATHUKORALA and HAL HILL, 'FDI and Host Country Development: The East Asian Experience.'
- 00/09 HAL HILL, 'East Timor: Development Policy Challenges for the World's Newest Nation.'
- 00/10 ADAM SZIRMAI, M P TIMMER and R VAN DER KAMP, 'Measuring Embodied Technological Change in Indonesian Textiles: The Core Machinery Approach.'
- 00/11 DAVID VINES and PETER WARR, 'Thailand's Investment-driven Boom and Crisis.'
- 01/01 RAGHBENDRA JHA and DEBA PRASAD RATH, 'On the Endogeneity of the Money Multiplier in India.'
- 01/02 RAGHBENDRA JHA and K V BHANU MURTHY, 'An Inverse Global Environmental Kuznets Curve.'
- 01/03 CHRIS MANNING, 'The East Asian Economic Crisis and Labour Migration: A Set-Back for International Economic Integration?'
- 01/04 MARDI DUNGEY and RENEE FRY, 'A Multi-Country Structural VAR Model.'
- 01/05 RAGHBENDRA JHA, 'Macroeconomics of Fiscal Policy in Developing Countries.'
- 01/06 ROBERT BREUNIG, 'Bias Correction for Inequality Measures: An application to China and Kenya.'
- 01/07 MEI WEN, 'Relocation and Agglomeration of Chinese Industry.'
- 01/08 ALEXANDRA SIDORENKO, 'Stochastic Model of Demand for Medical Care with Endogenous Labour Supply and Health Insurance.'
- 01/09 A SZIRMAI, M P TIMMER and R VAN DER KAMP, 'Measuring Embodied Technological Change in Indonesian Textiles: The Core Machinery Approach.'
- 01/10 GEORGE FANE and ROSS H MCLEOD, 'Banking Collapse and Restructuring in Indonesia, 1997-2001.'
- 01/11 HAL HILL, 'Technology and Innovation in Developing East Asia: An Interpretive Survey.'
- 01/12 PREMA-CHANDRA ATHUKORALA and KUNAL SEN, 'The Determinants of Private Saving in India.'
- 02/01 SIRIMAL ABEYRATNE, 'Economic Roots of Political Conflict: The Case of Sri Lanka.'

- 02/02 PRASANNA GAI, SIMON HAYES and HYUN SONG SHIN, 'Crisis Costs and Debtor Discipline: the efficacy of public policy in sovereign debt crises.'
- 02/03 RAGHBENDRA JHA, MANOJ PANDA and AJIT RANADE, 'An Asian Perspective on a World Environmental Organization.'
- 02/04 RAGHBENDRA JHA, 'Reducing Poverty and Inequality in India: Has Liberalization Helped?'
- 02/05 ARCHANUN KOHPAIBOON, 'Foreign Trade Regime and FDI-Growth Nexus: A Case Study of Thailand.'
- 02/06 ROSS H MCLEOD, 'Privatisation Failures in Indonesia.'
- 02/07 PREMA-CHANDRA ATHUKORALA, 'Malaysian Trade Policy and the 2001 WTO Trade Policy Review.'
- 02/08 M C BASRI and HAL HILL, 'Ideas, Interests and Oil Prices: The Political Economy of Trade Reform during Soeharto's Indonesia.'
- 02/09 RAGHBENDRA JHA, 'Innovative Sources of Development Finance - Global Cooperation in the 21st Century.'
- 02/10 ROSS H MCLEOD, 'Toward Improved Monetary Policy in Indonesia.'
- 03/01 MITSUHIRO HAYASHI, 'Development of SMEs in the Indonesian Economy.'
- 03/02 PREMA-CHANDRA ATHUKORALA and SARATH RAJAPATIRANA, 'Capital Inflows and the Real Exchange Rate: A Comparative Study of Asia and Latin America.'
- 03/03 PETER G WARR, 'Industrialisation, Trade Policy and Poverty Reduction: Evidence from Asia.'
- 03/04 PREMA-CHANDRA ATHUKORALA, 'FDI in Crisis and Recovery: Lessons from the 1997-98 Asian Crisis.'
- 03/05 ROSS H McLEOD, 'Dealing with Bank System Failure: Indonesia, 1997-2002.'
- 03/06 RAGHBENDRA JHA and RAGHAV GAIHA, 'Determinants of Undernutrition in Rural India.'
- 03/07 RAGHBENDRA JHA and JOHN WHALLEY, 'Migration and Pollution.'
- 03/08 RAGHBENDRA JHA and K V BHANU MURTHY, 'A Critique of the Environmental Sustainability Index.'
- 03/09 ROBERT J BAROO and JONG-WHA LEE, 'IMF Programs: Who Is Chosen and What Are the Effects?'
- 03/10 ROSS H MCLEOD, 'After Soeharto: Prospects for reform and recovery in Indonesia.'

- 03/11 ROSS H MCLEOD, 'Rethinking vulnerability to currency crises: Comments on Athukorala and Warr.'
- 03/12 ROSS H MCLEOD, 'Equilibrium is good: Comments on Athukorala and Rajapatirana.'
- 03/13 PREMA-CHANDRA ATHUKORALA and SISIRA JAYASURIYA, 'Food Safety Issues, Trade and WTO Rules: A Developing Country Perspective.'
- 03/14 WARWICK J MCKIBBIN and PETER J WILCOXEN, 'Estimates of the Costs of Kyoto-Marrakesh Versus The McKibbin-Wilcoxen Blueprint.'
- 03/15 WARWICK J MCKIBBIN and DAVID VINES, 'Changes in Equity Risk Perceptions: Global Consequences and Policy Responses.'
- 03/16 JONG-WHA LEE and WARWICK J MCKIBBIN, 'Globalization and Disease: The Case of SARS.'
- 03/17 WARWICK J MCKIBBIN and WING THYE WOO, 'The consequences of China's WTO Accession on its Neighbors.'
- 03/18 MARDI DUNGEY, RENEE FRY and VANCE L MARTIN, 'Identification of Common and Idiosyncratic Shocks in Real Equity Prices: Australia, 1982 to 2002.'
- 03/19 VIJAY JOSHI, 'Financial Globalisation, Exchange Rates and Capital Controls in Developing Countries.'
- 03/20 ROBERT BREUNIG and ALISON STEGMAN, 'Testing for Regime Switching in Singaporean Business Cycles.'
- 03/21 PREMA-CHANDRA ATHUKORALA, 'Product Fragmentation and Trade Patterns in East Asia.'
- 04/01 ROSS H MCLEOD, 'Towards Improved Monetary Policy in Indonesia: Response to De Brouwer'
- 04/02 CHRIS MANNING and PRADIP PHATNAGAR, 'The Movement of Natural Persons in Southeast Asia: How Natural?'
- 04/03 RAGHBENDRA JHA and K V BHANU MURTHY, 'A Consumption Based Human Development Index and The Global Environment Kuznets Curve'
- 04/04 PREMA-CHANDRA ATHUKORALA and SUPHAT SUPHACHALASAI, 'Post-crisis Export Performance in Thailand'
- 04/05 GEORGE FANE and MARTIN RICHARDSON, 'Capital gains, negative gearing and effective tax rates on income from rented houses in Australia'
- 04/06 PREMA-CHANDRA ATHUKORALA, 'Agricultural trade reforms in the Doha Round: a developing country perspective'
- 04/07 BAMBANG-HERU SANTOSA and HEATH McMICHAEL, ' Industrial development in East Java: A special case?'

- 04/08 CHRIS MANNING, 'Legislating for Labour Protection: Betting on the Weak or the Strong?'
- 05/01 RAGHBENDRA JHA, 'Alleviating Environmental Degradation in the Asia-Pacific Region: International cooperation and the role of issue-linkage'
- 05/02 RAGHBENDRA JHA, RAGHAV GAIHA and ANURAG SHARMA, 'Poverty Nutrition Trap in Rural India'
- 05/03 PETER WARR, 'Food Policy and Poverty in Indonesia: A General Equilibrium Analysis'
- 05/04 PETER WARR, 'Roads and Poverty in Rural Laos'
- 05/05 PREMA-CHANDRA ATHUKORALA and BUDY P RESOSUDARMO, 'The Indian Ocean Tsunami: Economic Impact, Disaster Management and Lessons'
- 05/06 PREMA-CHANDRA ATHUKORALA, 'Trade Policy Reforms and the Structure of Protection in Vietnam'
- 05/07 PREMA-CHANDRA ATHUKORALA and NOBUAKI YAMASHITA, 'Production Fragmentation and Trade Integration: East Asia in a Global Context'
- 05/08 ROSS H MCLEOD, 'Indonesia's New Deposit Guarantee Law'
- 05/09 KELLY BIRD and CHRIS MANNING, 'Minimum Wages and Poverty in a Developing Country: Simulations from Indonesia's Household Survey'
- 05/10 HAL HILL, 'The Malaysian Economy: Past Successes, Future Challenges'
- 05/11 ZAHARI ZEN, COLIN BARLOW and RIA GONDOWARSITO, 'Oil Palm in Indonesian Socio-Economic Improvement: A Review of Options'
- 05/12 MEI WEN, 'Foreign Direct Investment, Regional Geographical and Market Conditions, and Regional Development: A Panel Study on China'
- 06/01 JUTHATHIP JONGWANICH, 'Exchange Rate Regimes, Capital Account Opening and Real Exchange Rates: Evidence from Thailand'
- 06/02 ROSS H MCLEOD, 'Private Sector Lessons for Public Sector Reform in Indonesia'
- 06/03 PETER WARR, 'The Gregory Thesis Visits the Tropics'
- 06/04 MATT BENGE and GEORGE FANE, 'Adjustment Costs and the Neutrality of Income Taxes'
- 06/05 RAGHBENDRA JHA, 'Vulnerability and Natural Disasters in Fiji, Papua New Guinea, Vanuatu and the Kyrgyz Republic'
- 06/06 PREMA-CHANDRA ATHUKORALA and ARCHANUN KOHPAIBOON, 'Multinational Enterprises and Globalization of R&D: A Study of U.S-based Firms'

- 06/07 SANTANU GUPTA and RAGHBENDRA JHA, 'Local Public Goods in a Democracy: Theory and Evidence from Rural India'
- 06/08 CHRIS MANNING and ALEXANDRA SIDORENKO, 'The Regulation of Professional Migration in ASEAN - Insights from the Health and IT Sectors'
- 06/09 PREMA-CHANDRA ATHUKORALA, 'Multinational Production Networks and the New Geo-economic Division of Labour in the Pacific Rim'
- 06/10 RAGHBENDRA JHA, RAGHAV GAIHA and ANURAG SHARMA, 'On Modelling Variety in Consumption Expenditure on Food'
- 06/11 PREMA-CHANDRA ATHUKORALA, 'Singapore and ASEAN in the New Regional Division of Labour'
- 06/12 ROSS H MCLEOD, 'Doing Business in Indonesia: Legal and Bureaucratic Constraints'
- 06/13 DIONISIUS NARJOKO and HAL HILL, 'Winners and Losers during a Deep Economic Crisis; Firm-level Evidence from Indonesian Manufacturing'
- 06/14 ARSENIO M BALISACAN, HAL HILL and SHARON FAYE A PIZA, 'Regional Development Dynamics and Decentralization in the Philippines: Ten Lessons from a 'Fast Starter''
- 07/01 KELLY BIRD, SANDY CUTHBERTSON and HAL HILL, 'Making Trade Policy in a New Democracy after a Deep Crisis: Indonesia'
- 07/02 RAGHBENDRA JHA and T PALANIVEL, 'Resource Augmentation for Meeting the Millennium Development Goals in the Asia Pacific Region'
- 07/03 SATOSHI YAMAZAKI and BUDY P RESOSUDARMO, 'Does Sending Farmers Back to School have an Impact? A Spatial Econometric Approach'
- 07/04 PIERRE VAN DER ENG, 'De-industrialisation' and Colonial Rule: The Cotton Textile Industry in Indonesia, 1820-1941'
- 07/05 DJONI HARTONO and BUDY P RESOSUDARMO, 'The Economy-wide Impact of Controlling Energy Consumption in Indonesia: An Analysis Using a Social Accounting Matrix Framework'
- 07/06 W MAX CORDEN, 'The Asian Crisis: A Perspective after Ten Years'
- 07/07 PREMA-CHANDRA ATHUKORALA, 'The Malaysian Capital Controls: A Success Story?'
- 07/08 PREMA-CHANDRA ATHUKORALA and SATISH CHAND, 'Tariff-Growth Nexus in the Australian Economy, 1870-2002: Is there a Paradox?'
- 07/09 ROD TYERS and IAN BAIN, 'Appreciating the Renbimbi'
- 07/10 PREMA-CHANDRA ATHUKORALA, 'The Rise of China and East Asian Export Performance: Is the Crowding-out Fear Warranted?'

08/01 RAGHBENDRA JHA, RAGHAV GAIHA AND SHYLASHRI SHANKAR, 'National Rural Employment Guarantee Programme in India – A Review'

08/02 HAL HILL, BUDY RESOSUDARMO and YOGI VIDYATTAMA, 'Indonesia's Changing Economic Geography'

08/03 ROSS H McLEOD, 'The Soeharto Era: From Beginning to End'

08/04 PREMA-CHANDRA ATHUKORALA, 'China's Integration into Global Production Networks and its Implications for Export-led Growth Strategy in Other Countries in the Region'

08/05 RAGHBENDRA JHA, RAGHAV GAIHA and SHYLASHRI SHANKAR, 'National Rural Employment Guarantee Programme in Andhra Pradesh: Some Recent Evidence'

08/06 NOBUAKI YAMASHITA, 'The Impact of Production Fragmentation on Skill Upgrading: New Evidence from Japanese Manufacturing'

08/07 RAGHBENDRA JHA, TU DANG and KRISHNA LAL SHARMA, 'Vulnerability to poverty in Fiji'

08/08 RAGHBENDRA JHA, TU DANG, 'Vulnerability to poverty in Papua New Guinea'