Mining and Poverty in Papua New Guinea: Case Studies at Ok Tedi and Porgera

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Presentation Outline

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Empirical evidence is mixed

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Our Story

In Papua New Guinea (PNG) mining is controversial.

Dramatic environmental and social consequences that have dogged mining development in PNG over the last several decades.

The focus in the present paper is on the relationship between mining and poverty in two of the country's largest mining regions – Ok Tedi and Porgera.

Theory: Sustainable livelihood framework.

Methods: logistic regression and propensity score matching to investigate the differences between mining and non-mining villages in these two regions.

Results: The results overall suggest that mining does reduce poverty and improve their welfare.

Why should mining reduce poverty?

1) historical analogy where most developed countries today were resource rich;

2) mining can reduce poverty most directly through the creation of jobs which can generate income for workers and their families;

3) mining can generate a substantial amount of revenue for government to use for targeted poverty reduction programs;

4) mining can contribute to economic growth;

5) mining can indirectly lead to poverty reduction through technology transfers;

6) mining investment in infrastructure contributes to economic development; mining companies can lead to businesses downstream processing.

Empirical evidence is mixed

1) mineral-dependent states have significantly higher levels of inequality than other states with similar incomes;

2) mining often fails to provide jobs that are accessible to the poor, who are generally unskilled or semi-skilled;

3) typically there are few jobs in relation to the amount of investment;

4) cross-sectional studies point to lower level of education expenditure in countries with a higher share of natural capital;

5) there are many example where revenues from mining were collected by central government, but there was little benefit to the mining regions.

Project Sites
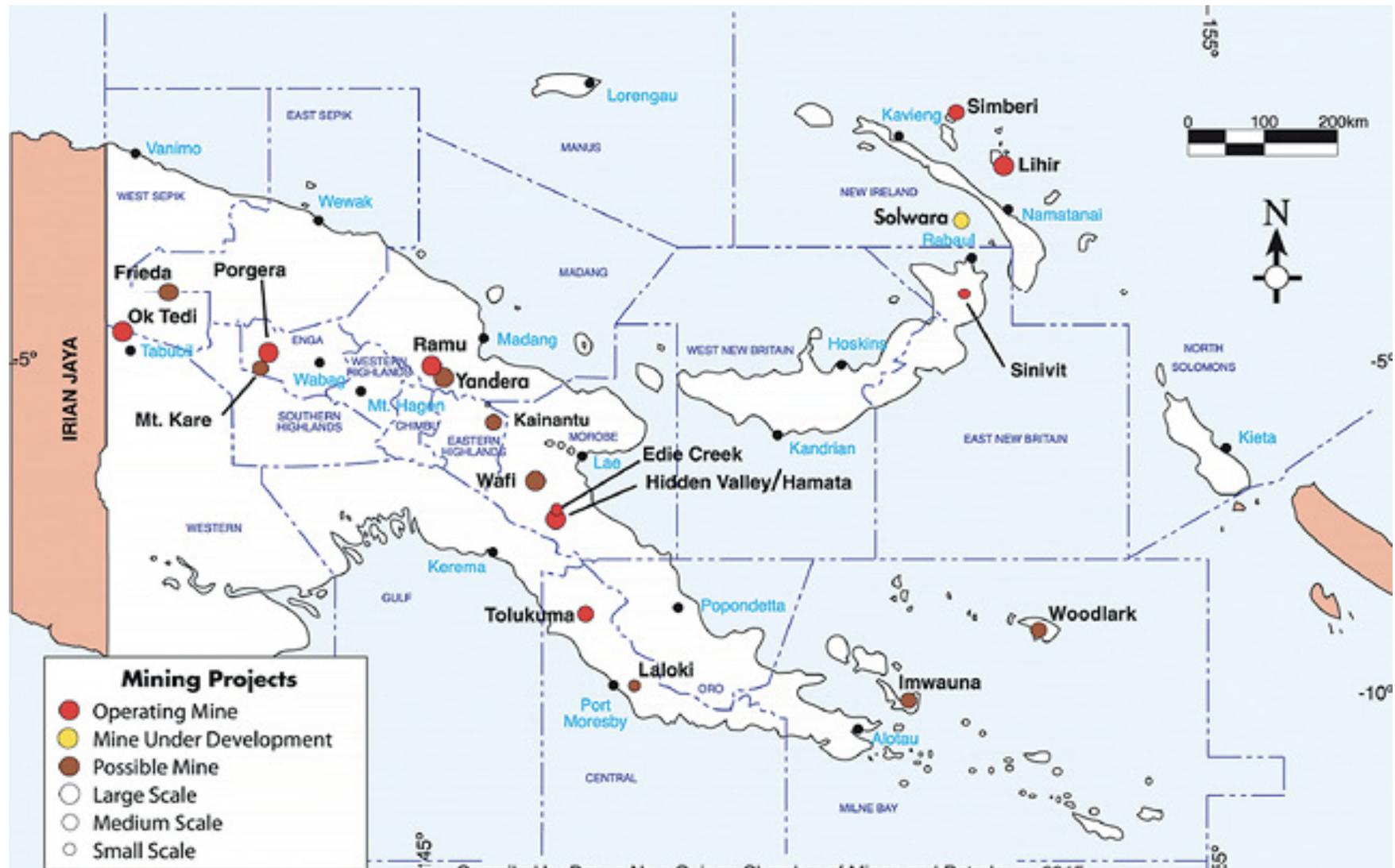
The Sustainable Livelihood Framework (SLF)

SLF is central to explaining the relationship between the people and their livelihoods

It is therefore pivotal in understanding the conceptual and methodological issues in sustaining rural livelihoods.

The concept of 'sustainable rural livelihoods' is increasingly central to the debate about rural development, poverty, education and environmental management

The Sustainable Livelihood Framework (SLF)

- The key question to ask in any analysis of sustainable livelihoods is– Given a particular *context*, what combination of *livelihood resources* result in the ability to follow what combination of *livelihood strategies* with what *outcomes*? Of particular interest in this framework are the *institutional processes* which mediate the ability to carry out such strategies and achieve (or not) such outcomes"

- Ashley and Carney (1999) define sustainable livelihood as a way of thinking about development's objectives, scope and priorities in order to enhance poverty elimination.

# The Sustainable Livelihood Framework
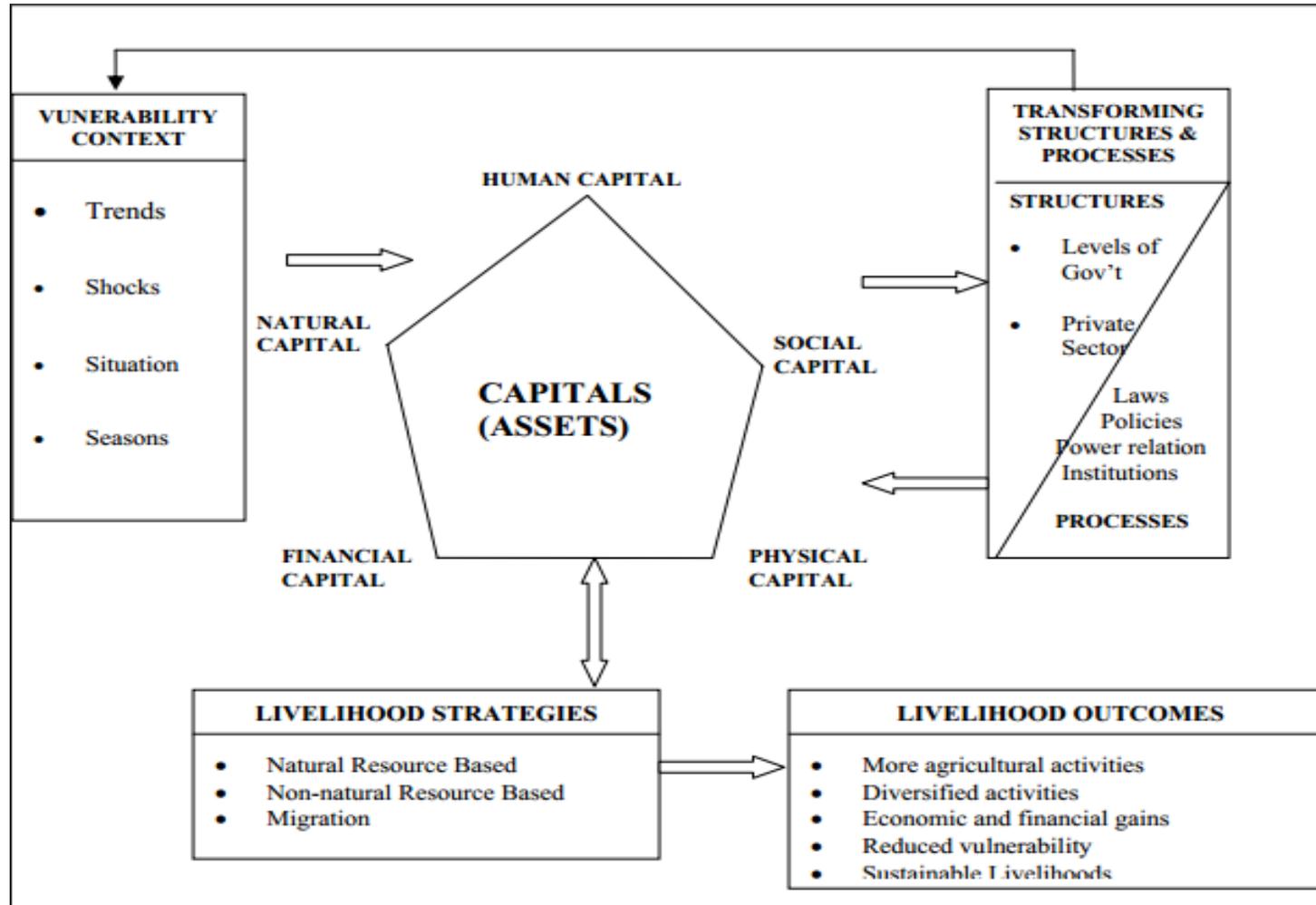
Mining-Poverty Reduction Linkages

Applying the SLF, this study explores the extent to which the development of mining in PNG has impacted on local people's livelihoods in the context of the four linkages between mining and poverty reduction highlighted in theory.

The development of mines provided economic opportunities for the people to participate.

The key question is: is this a sustainable development within the SLF definition?

Mining-Poverty Reduction Linkages
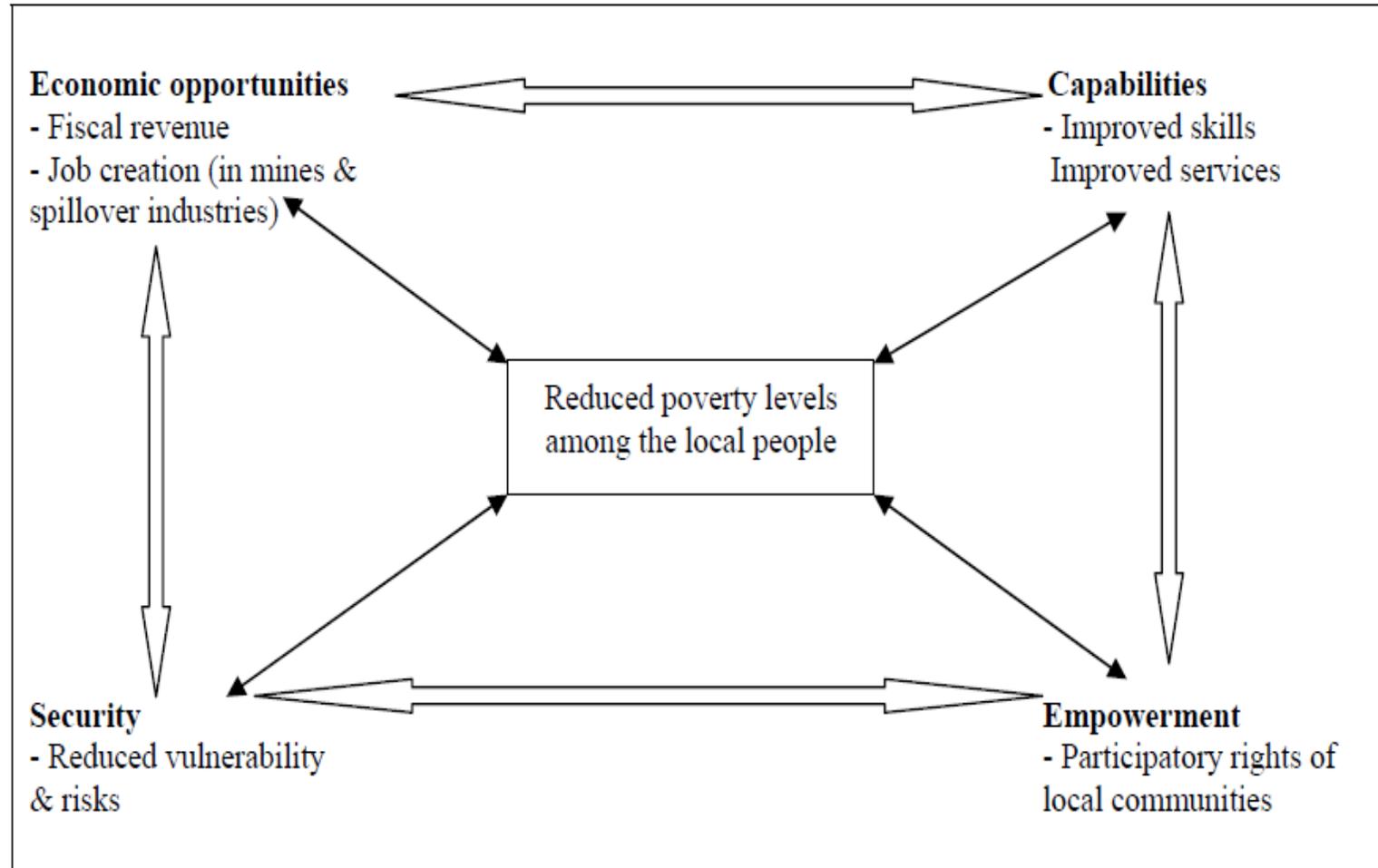
Data

Sample size 609

1) Ok Tedi mining households 153
2) Ok Tedi non-mining households 149
3) Porgera mining households 156
4) Porgera non-mining households 151

Methods

1) Logistic regression
   a) Dummy variable
   b) With additional explanatory variables

2) Propensity score matching

1 Logistic regression

- Firstly, subjects in the mining (treatment) and non-mining (control) groups were matched with one another by their propensity scores as calculated according to their attributes.

- The score is calculated by a logit or probit analysis.

- "To create the propensity score, a common first step is to use a logit or probit regression with treatment as the outcome variable and the potential confounders as explanatory variables"

- In this study, a logistic model was set up to test the association between factors that were considered likely to determine the level of poverty.

- For instance, a mining household can have access to education and education grants for their children, while a non-mining household has access to neither.

2 Propensity score matching (PSM)

PSM has become a popular approach to estimate causal effects in situations where confounding variables could cause bias in estimates of treatment effects, obtained by comparing outcomes of those receiving the treatment and those not receiving it.

PSM: match treated and untreated observations on the estimated probability of being treated (propensity score).

Match on the basis of the propensity score (can be defined as the probability of study participants receiving a treatment based on observed characteristics)

Results: logistic regression (combined Ok Tedi and Porgera)

Mining and Non-mining	Coefficient	Std. Error	Z	P>z	[95% Confidence Interval]	
Human Capital	1.46	0.38	3.85	0.000***	0.72	2.20
Inside Capital	0.42	0.09	4.40	0.000***	0.23	0.60
Village participation to help	0.55	0.14	3.83	0.000***	0.27	0.83
Information Volunteering	-0.33	0.15	-2.22	0.027***	-0.72	-0.11
Food eaten in the last 30 days	2.10	0.36	5.89	0.000***	1.40	2.81
Square meals eaten in the last 12 months	1.75	0.33	5.25	0.000***	1.10	2.50
Income Satisfaction	-2.36	0.45	-5.28	0.000***	-3.23	-1.48
Rich & Poor Ladder	1.05	0.15	6.84	0.000***	0.75	1.36
Constant	-4.18	0.68	-6.15	0.003	-5.51	-2.84

Results: human capital
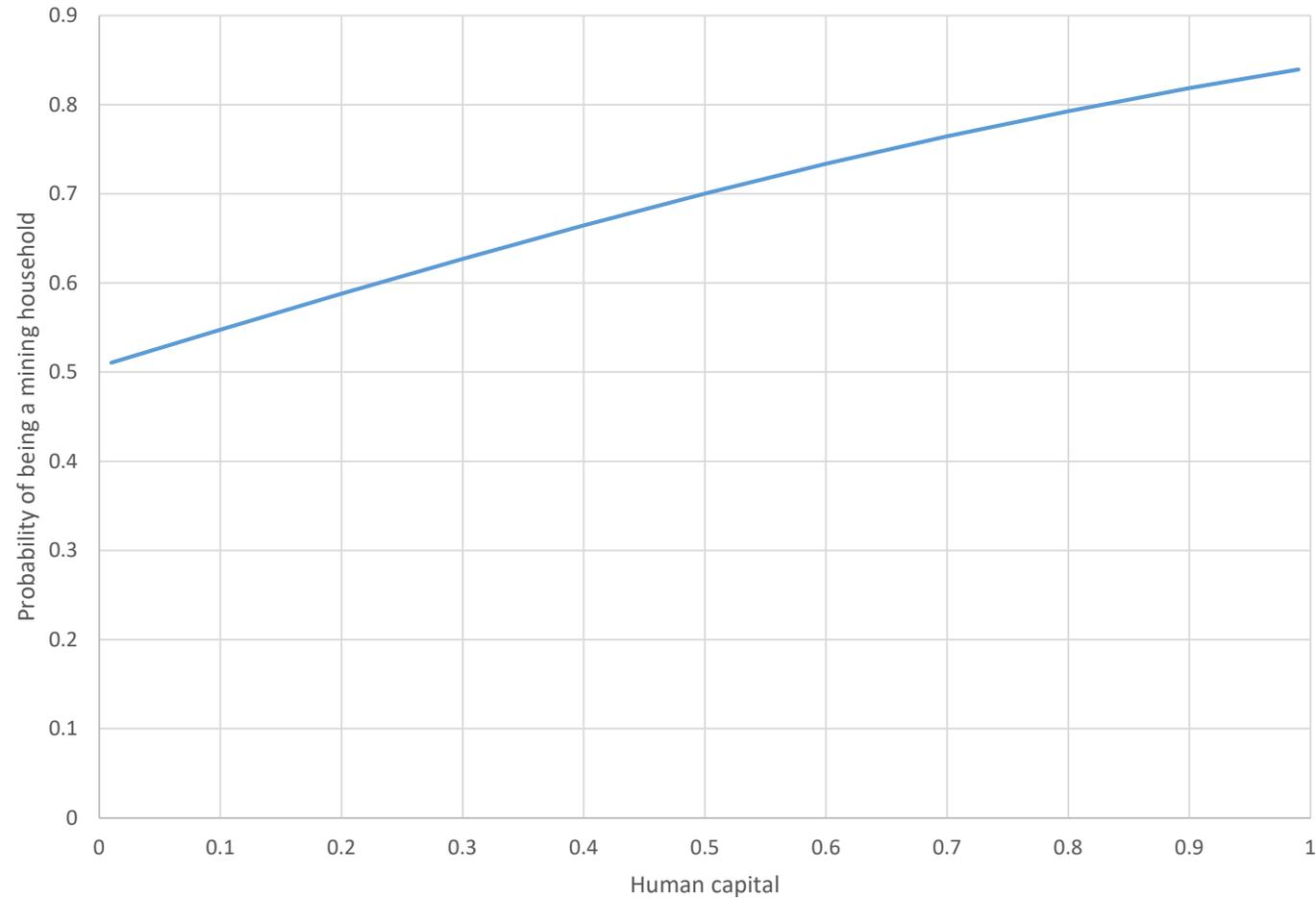
Results: rich-poor ladder
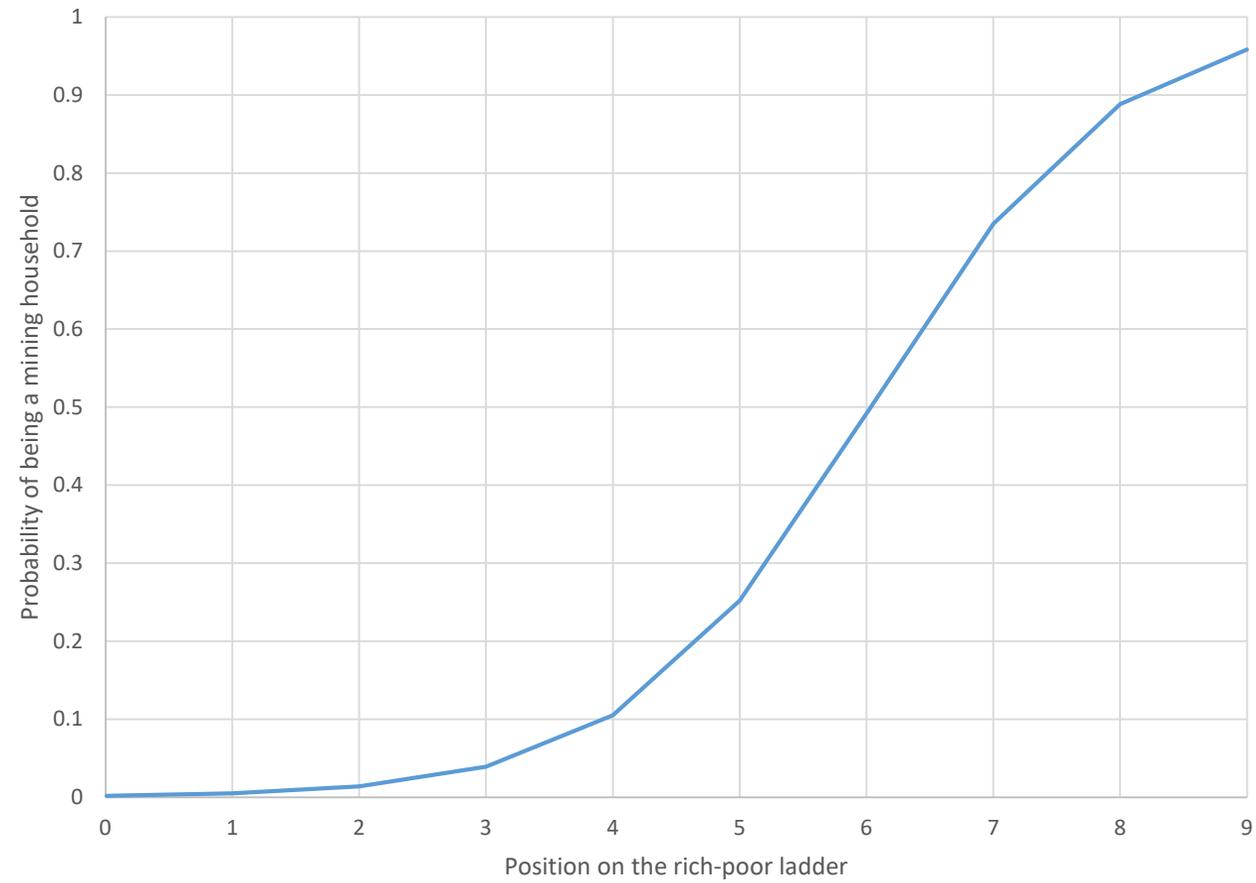
Results: Average Treatment Effects on the Treated (ATT) and t-statistics for Different Matching Methods, with the Rich-Poor Ladder as the Performance Index

Model 1: Regional Ok Tedi Mining	ATT	Standard Error	t
Radius	0.890	0.166	5.365
Kernel	1.184	0.451	2.623
Regression	1.055	0.154	6.84
Dummy Variable Regression	2.324	0.105	22.10

Results: Average Treatment Effects on the Treated (ATT) and t-statistics for Different Matching Methods, with the Rich-Poor Ladder as the Performance Index

Model 2: Regional Porgera Mining	ATT	Standard Error	t
Radius	0.862	0.362	2.384
Kernel	-0.703	1.280	-0.549
Regression	1.427	0.270	5.29
Dummy Variable Regression	2.193	0.135	16.170

Results: Average Treatment Effects on the Treated (ATT) and t-statistics for Different Matching Methods, with the Rich-Poor Ladder as the Performance Index

Model 3: Combined OK Tedi and Porgera Mining	ATT	Standard Error	t
Radius	1.561	0.664	2.352
Kernel	0.138	0.323	0.431
Regression	1.819	0.583	3.120
Dummy Variable Regression	2.457	0.126	19.55

Conclusion

Model 1, Model 2 and Model 3 have indicated that mining has improved & increased the mining household's position on the rich-poor ladder significantly

Further introduction of mining in PNG should consider closely how to improving indigenous people's livelihoods taking into consideration how developments prospects reduce poverty.

Further study can consider the monetary values, and actual support given to the mining communities.

The End

Comments and questions welcome

https://ideas.repec.org/p/ags/aare19/283884.html