International Journal of Scientic Conference and Call for Papers

Food Production, Poverty Indices and Capability Related Variables (Case of Central Java and Yogyakarta Provinces)

Deffi Ayu Puspito Sari

Universitas Bakrie
E-mail: deffi.sari@bakrie.ac.id

Abstract. This paper tries the econometric analyses of poverty from the view point of the capability approach. Taking food production into consideration, this study shows that poverty indices are affected significantly by capability related variables. The objective of this paper is to analyze the relation of poverty from the consumption approach and the capability approach. Secondary panel data of head count index, poverty gap and poverty severity and variables of capability as well as food production were analyzed from 34 districts in Central Java and Yogyakarta Province. In conclusion, the relation observed in this paper is between capability poverty improvement and decreasing consumption poverty. Any economic development meant to increase income or consumption is important, but this is not the direct aim of the poverty reduction policies/programs. They should directly target the various elements of poverty and allocate budgets to such fields.

Keywords**:** Capability Approach, Poverty, Amartya Sen, Consumption Approach, Poverty Indices.

I. INTRODUCTION

Poverty is a problem faced by countries around the world. While the poor are mostly live in the villages and most of them are marginal farmers, poverty is a no exception for people live in urban area. The understanding of poverty itself widened by the concept of capability, thus poverty is not merely focus on income deprivation, but also refer to a condition with lack of ability to have fulfilled or productive life. Factors influencing poverty is also becoming diverse; from uncontrolled population growth, disaster, changes in environment such as uncertain climate variability that affects food production [1], epidemic or emerging diseases, and many other threats that can cause insecurity to a well functioning life. Previous study has discussed the definition and relation between consumption poverty and capability approach-poverty [2][3]. In this paper, analysis of those two variables was studied with additional influence of food production and impact of development in a longer time series.

This study used data from two provinces in Indonesia, in all, 50% of Indonesia's people call Java home. Java is also an island with the highest poverty incidence. The provinces of Yogyakarta and Central Java are examined in this study, since poverty is high in these areas. Figure 1 shows the poverty rate in Java in 2007. The highest head count index (P_0) values in Java in 2007 were in Wonosobo (32.29%), Rembang (30.71%), Kebumen (30.25%), and Purbalingga (30.24%), all of which are found in Central Java.

II. METHODS

Quantitative study was conducted to analyse secondary data that examined using econometric analysis. Panel data from 34 districts in Central Java and Yogyakarta for four years time series has analysed total 170 data set.

III. RESULT AND DISCUSSION

This study used data from two provinces in Indonesia, in all, 50% of Indonesia's people call Java home. Java is also an island with the highest poverty incidence. The provinces of Yogyakarta and Central Java are examined in this study, since poverty is high in these areas. Figure 1 shows the poverty rate in Java in 2007. The highest head count index (P_0) values in Java in 2007 were in Wonosobo (32.29%), Rembang (30.71%), Kebumen (30.25%), and Purbalingga (30.24%), all of which are found in Central Java.
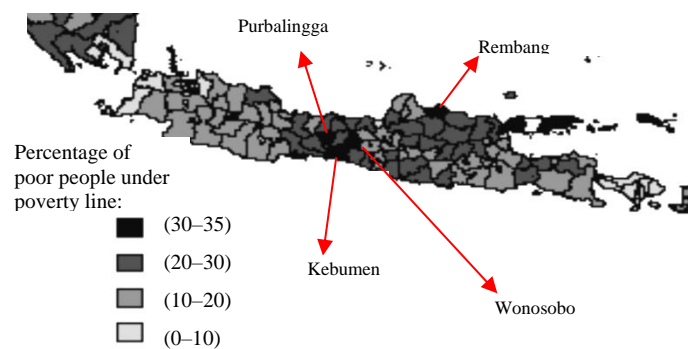

Figure 1. Head Count Index (P_0) in Java, 2007
Source: Authors' calculations, using data from BPS (2008) with R2.7.1, Maptools [4],[5]

To improve our understanding of poverty in these areas, the five districts with the highest access to capability and the largest poverty-index values are shown in Table 1. For the cases of Wonogiri and Gunung Kidul: among the 34 districts in the sample, both have the highest upland crop production rates and largest areas harvested. Gunung Kidul—most of which is arid, dry, and lacking in irrigation—is known as a poor area. It is commonly understood that these districts—which rely mainly on secondary crops—could have high poverty-index values. Having dry and arid land, the people of

Gunung Kidul cannot produce enough rice for their own consumption; cassava has been a substitute staple food. Realizing the poor conditions in these areas, the government has sought to provide support through various programs; for example, there were the underdeveloped village subsidy program (IDT) in Gunung Kidul, a transmigration and dam project in Wonogiri, and various programs that provide other basic needs such as health and sanitation. These programs could help mitigate poverty in these areas. Three districts in Yogyakarta province known to be poor are Gunung Kidul, Sleman, and Kulon Progo. In Gunung Kidul and Kulon Progo, access to sanitation and health services is the highest of all 34 districts. In Sleman, the high school completion rate and safe water access have been important in reducing poverty there.

In Table 1, Kebumen and Wonosobo (blue color) are among the highest-ranking districts in our sample, in terms of poverty-index values. The total area of Kebumen is around 1,281 km^2; of that, about 40% is used in nonirrigated paddy-field and upland farming, and 15% in irrigated paddy-field farming. The people of Kebumen mainly depend on upland farming, with intercropping and double-cropping. Kebumen shows a high Engel coefficient, with most of the farmers being upland and poor. The poor's food expenditure, as a ratio of all expenditures, is high (i.e., number four, among our sample); a high food-expenditure ratio is a burden on the poor, as it restricts their investment in other capability variables. A policy regarding inexpensive food is still needed in this district. In Wonosobo, the elementary-school dropout ratio is the second-highest among our sample. Birth control program participation is high in this district, but access to other capability variables is low and cannot mitigate the impact of the deepness and severity of the poverty there.

In Table 1, no cities are found within the top five poverty-index values. Access to health is high in Semarang and Salatiga (yellow color), and access to education is high in Semarang and Surakarta. No cities have high elementary-school dropout rates or high food expenditures. Urbanization has lifted many people out of poverty. In districts with more rural areas (and with fewer economic opportunities), investment in the basic-needs capabilities of health and education could help people there obtain many more opportunities and finally decrease the region's overall poverty-index values. The poor districts have been assisted by investments in areas related to capability-related variables. Based on the capability approach, we can consider such facilities as having contributed to a reduction in poverty.

Mubyarto [6] studies an interesting case of poverty in Yogyakarta. At the end of the 1960s, Yogyakarta was well-known as the third poorest province in Indonesia (after East Nusa Tenggara and West Nusa Tenggara), since 47% of its territory—namely, Gunungkidul—is an arid area. Most areas within Gunungkidul district and Kulonprogo district, and some areas in Bantul district, were dry and lacked irrigation. Locals consumed cassava or *gaplek* as staple foods. In 1973, Penny and Singarimbun published a monograph titled *Population and Poverty in Rural Java: An Economic Arithmetic from Sriharjo*, which not only made Sriharjo village well-known, but also made Yogyakarta province practically synonymous with poverty. Three decades later, Yogyakarta has changed from one of the poorest provinces in Indonesia to one of the most prosperous; it is tied with Jakarta for having the longest life expectancy in the country (i.e., 71 years in 2000). The key to this change is found in the HDI of Yogyakarta, which is the fourth-largest in Indonesia [7].

Supported by various projects, programs, and appropriate government policies, the rural poor can improve their capability. Investments in improvement in health and education could contribute to poverty alleviation in rural areas.

TABLE 1
TOP FIVE DISTRICTS IN ACCESS TO CAPABILITY VARIABLES AND HIGHEST POVERTY INDICES

	2008 Ranking (High to Low)				
	1	**2**	**3**	**4**	**5**
Head Count Index (P_0)	Kebumen	Wonosobo	Rembang	Purbalingga	Kulon progo
Poverty Gap (P_1)	Wonosobo	Kebumen	Purbalingga	Kulon progo	Brebes
Poverty Severity (P_2)	Wonosobo	Kebumen	Purbalingga	Kulon progo	Sragen
Safe Water Access	Salatiga	Sragen	Kudus	Sleman	Semarang
Toilet Availability	Gunungkidul	Kulon progo	Salatiga	Wonogiri	Semarang
Birth Control Program Participation	Banjarnegara	Wonosobo	Semarang	Temanggung	Rembang
BCG Vaccination	Kulonprogo	Banyumas	Sragen	Temanggung	Semarang
Elementary-School Dropout Rate	Batang	Wonosobo	Pekalongan	Kendal	Pemalang
High-School Completion Rate	Semarang	Surakarta	Klaten	Sleman	Sukoharjo
Food Expenditure of Poor	Batang	Tegal	Pekalongan	Kebumen	Pemalang
Rice Area and Production	Cilacap	Grobogan	Pati	Brebes	Sragen
Upland Crops Area and Production	Wonogiri	Gunung kidul	Grobogan	Pati	Banjarnegara

Source: BPS (2009)

The capability approach defines poverty as capability deprivation. Amartya Sen [8] considered capability as the substantive freedom to functioning which enable people to enjoy leading the kind of valuable life. In the approach, functioning is the subject of the capabilities referred to: what a person is capable, wants to be capable, or should be capable of being/doing. Living may be seen as a set of interrelated functioning. A person's chosen combination of functioning, what one is and does, is a part of one's overall capability set, which is the functioning he or she is capable of doing.

Table 2 examines capability variables—not only health, education, and food expenditure, but also rice and secondary-crop production—and their relationships with poverty indices. Improvements in farmers' capability in increasing their production tends to reduce all poverty indices. Quantitative analysis was done using panel data and the following model:

$$y_{it} = \alpha + \beta_1 x_{it,1} + ... + \beta_k x_{it,k} + u_{it}$$

(1)

where
y = Percentage of poor by head count index/poverty gap/poverty severity
α = Intercept
x = Variables related to capability variables
i = Area (districts)
u = Residual
t = Years of 2005–2008

Increasing the capability of farmers to improve their production skills tends to decrease all poverty indices. Quantitative analysis using panel data from year 2005 to 2008 of 34 districts in Central Java and Yogyakarta provinces was carried out, the result could be seen in Table 2.

Rice production and the area harvested are negatively related to all poverty indices (except P2-Severity Poverty- for rice production; it is negative, but not significant). This means that farmers become poorer if they decrease their production and the area harvested. For farmers under severe poverty indicated by P2, increasing their production may improve their life condition, but we find no significant impact. Farmers under severe poverty may have so small land that their rice production increase the production cost and have causes no significant impacts. However, when they increase their area under harvest, the result becomes significant at 10%, (meaning that improving the area under rice cultivation is important to alleviate the problems of farmers facing severe poverty). As smaller land cause the disguised unemployment of farmers, the increase of cultivation reduces such unemployment problem and improves their economic condition.

Regarding secondary crops production and the area harvested, no results are significant. This explains why farmers in areas under severe poverty depend more on secondary crops farming than those under less poverty. Secondary crops are still considered as "catch crops" that poor farmers use to maintain their subsistence level of income.

Unsurprisingly, expenditure of the poor on food is positively correlated with poverty: share of their food expenditure increases causes the poverty ratio increases. Households under severe poverty have higher share of food expenditure compared to less poor households.

The education variables do not make a significant impact on poverty indices. It would require longer time for this sector to make an impact on poverty indices.

In the health sector, only BCG vaccination has significantly positive impacts on P_1-Poverty Ratio- and P_2. To guarantee the availability of BCG all children under the age of five, including those from poor families, community-based health services (Posyandu: *Pos Pelayanan Terpadu*) provides BCG vaccination free of charge. It is also available in hospitals, but not free. Statistical data record larger amount of beneficiaries of community-based services rather than those of hospitals. The result is significant for the variable of availability of private or common toilets. Variables of participation in birth control programs and access to safe water show negative signs, but not significant. Improving the health-related basic facilities of households tend to decrease their poverty indices.

It is noteworthy that the city dummy unsurprisingly gives a significantly negative result. This implies that the urbanization can improve the condition of poor areas.

As the improvement in capability related variables can reduce poverty indices, improvement in these variables could be used as means to decrease consumption poverty. New paradigm based on the reverse relation between ends and means can contribute to the removing consumption poverty through improving capability of people. This has very practical policy implication that the effective and proper budget allocation to the sectors which have close relation with consumption poverty. Poverty reduction program under such poverty reduction strategy can reduce the expense of budget and effectively reduce the share of poverty. The capability approach gives us a different view on poverty and poverty reduction policy.

TABLE 2
CAPABILITY VARIABLES CONTRIBUTING TO POVERTY REDUCTION

	R–squared	Constant	city	d05	d06	d07	d08	water	toilet	birthc	bcg	edr	hcr	Fep	rprod	scprod	rarea	scarea
P_0	0.50	−9.10	−0.89	0.05	0.18	−0.68	0.01	−0.08	−0.10	−0.44	0.84	−0.09	−0.04	2.99	−0.09			
		*	***		**	***								***	**			
P_1	0.40	−16.03	−0.91	0.25	0.18	−0.50	0.10	−0.09	−0.22	−0.46	2.05	−0.03	0.00	2.96	−0.10			
		**	***	***	*	**			**		*			***	*			
P_2	0.30	−20.20	−0.85	0.32	0.17	−0.40	0.04	−0.16	−0.30	−0.52	2.92	−0.02	0.03	2.88	−0.10			
		**	***	***					**		**			***				
P_0	0.49	−8.36	−0.48	0.04	0.20	−0.60	−0.03	−0.09	−0.16	−0.52	0.85	−0.19	−0.04	2.69			0.03	
			***		**	***			*					***				
P_1	0.38	−15.09	−0.47	0.23	0.19	−0.41	0.06	−0.10	−0.27	−0.56	2.04	−0.14	−0.01	2.64			0.03	
		**	***	**	**	*			**		*			***				
P_2	0.29	−18.59	−0.36	0.29	0.19	−0.30	−0.01	−0.17	−0.37	−0.65	2.84	−0.13	0.02	2.49			0.04	
		**	*	**					***		**			**				
P_0	0.50	−9.17	−0.90	0.06	0.18	−0.68	0.01	−0.09	−0.10	−0.43	0.78	−0.08	−0.04	2.97		−0.10		
		*	***		**	***								***		**		
P_1	0.40	−16.07	−0.94	0.25	0.18	−0.50	0.10	−0.09	−0.21	−0.46	1.98	−0.02	−0.001	2.96		−0.11		
		**	***	***	*	**			**		*			***		**		
P_2	0.30	−20.24	−0.88	0.32	0.17	−0.41	0.04	−0.17	−0.29	−0.51	2.84	0.00	0.02	2.88		−0.11		
		**	***	***					**		**			***		*		
P_0	0.49	−8.11	−0.47	0.04	0.20	−0.60	−0.03	−0.09	−0.16	−0.54	0.84	−0.19	−0.04	2.67				0.03
			***		**	***			*					***				
P_1	0.39	−14.87	−0.47	0.23	0.20	−0.40	0.06	−0.10	−0.28	−0.57	2.05	−0.14	−0.004	2.63				0.03
		**	***	**	**	*			*		*			***				
P_2	0.29	−18.39	−0.35	0.29	0.20	−0.29	−0.01	−0.16	−0.37	−0.67	2.85	−0.13	0.02	2.48				0.05
		**	*	**					***		**			**				

Note: ***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level. n = 170, t = 2004–2008, i = 34 districts,
d city: city dummy (Kota Surakarta, Kota Salatiga, and Kota Semarang), where "city" refers to administrative level

city (*Kota*), others are districts (*Kabupaten*)	birthc: Log form of participation in birth control program	hcr: Log form of high-school completion ratio	rarea: log form of rice area harvested
d05–d08: Year dummy	bcg: Log form of bcg vaccination	fep: Log form of food expenditure of a poor	scarea: log form of secondary crop area harvested

toilet: Log form of access to private/common toilet   edr: Log form of elementary dropout ratio   rprod: Log form of rice production   water: log form of safe water access

Source: Author, using R and data from BPS, various years.

Whereas the ends of poverty alleviation is to alleviate income poverty, various programs that invest in health and education could be the means to increasing poor people's capability, decreasing capability poverty, and generating greater earning power. Since the capability concept was introduced by Sen in the 1980s, the concept has been developed and implemented in various ways; many human development-related indices serve as examples. This study observations and analyses of the case of Indonesia supports Sen's idea. Economic development aims to increase income or consumption, but it is only one end of policies and programs. Poverty reduction policies directly target the various elements of poverty and allocate budgets to those areas.

IV. CONCLUSIONS

The econometric analyses in this study show that poverty indices are affected significantly by capability-related variables. As improvements in capability variables can reduce poverty index values, such improvements could be used to mitigate consumption poverty. A new paradigm based on the reverse relationship between ends and means can contribute to a removal of consumption poverty by improving the capability of people. The capability approach, in this way, gives us a different view of poverty and poverty-reduction policies.

REFERENCES

[1] Deffi, A. P. S. (2010). Changes in the Upland Crop Farm Economy in INDONESIA. *TOHOKU JOURNAL OF RURAL ECONOMICS*, *28*(2), 30-37.

[2] Sari, D. A. P., & Kawashima, S. (2016). Poverty Mapping And Poverty Analysis In Indonesia. *Jurnal Agro Ekonomi*, *28*(1), 95-111.

[3] Sari, D. A. P. (2012). education, health, and basic needs: Increasing capabilities to escape poverty. *Three Reasons Why We Should Study Human Security*, *1*, 8-24.

[4] Badan Pusat Statistik (BPS). (2008). *Data dan Informasi Kemiskinan Tahun 2007*. Jakarta: CV. Nario Sari. Various issues of year 2003, 2004, 2005 and 2006, and 2008.

[5] R Development Core Team. (2008). *R: A Language and Environment for Statistical Computing,* R Foundation for Statistical Computing, Vienna, Austria, ISBN 3-900051-07-0, URL http://www.R-project.org.

[6] Mubyarto. (2002). *Kemiskinan dan Ekonomi Rakyat Yogyakarta.* http://www.ekonomirakyat.org/edidi_1/artikel_1.htm.

[7] Badan Pusat Statistik (BPS). 2009b. "Human Development Index (HDI) by Province and National", http://dds.bps.go.id

[8] Sen, A.K. (1999). *Development as Freedom.* New York: Alfred Knof.