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The Consumption-Health Nexus Revisited: Examining the Benefits of Social Insurance for the Poor in Indonesia

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Households in developing countries are typically more vulnerable to illness episodes. This paper uses a panel micro data set from Indonesia to investigate whether households are able to smooth their consumption against idiosyncratic health shocks and to examine the mitigating effects of a social health insurance programme for the poor on such shocks. We find that Indonesian households manage to keep consumption smooth after deterioration in adult health. These findings are robust to various health measures and different specifications. The difference-in-differences (DiD) estimator shows a marginal effect of the insurance programme on insuring household consumption from major health problems. Further investigation reveals heterogeneous effects of the social insurance programme. While it plays a trivial role in protecting rural households, the effect of the health intervention is stronger in urban areas of the country. We argue that supply-side factors seem to be partly responsible for this finding.

Keywords: consumption smoothing, health shocks, social health insurance

1. Introduction

The provision of equitable access to health care for all people has become a global and national development agenda after the implementation of the United Nations resolution on universal health coverage (UHC) in December 2012. Social health insurance which provides protection to the beneficiary against health events is a usual instrument of government to achieve this ambitious goal. Yet, in the

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context of developing countries, it is the seminal contribution of Murdoch in 1995 that challenges the net benefits of formal insurance to society. He argues that individuals and households in this economy are able to cope with any type of income risks as a result of the availability of sophisticated risk-coping strategies among themselves.

Under the assumption that households are risk aversion, Chetty and Looney (2006) derive a simple model of risk and insurance to show that the welfare gains of social insurance in a low-income economy, indeed, come from its capability in eliminating the use of costly risk management techniques by households when they cope with income shocks, such as reduction in human capital investments. The authors further conclude that the understanding of why and how households smooth their consumption is imperative in assessing the welfare effects of social insurance programmes.

The main objectives of this paper are therefore to advance research on the risk and formal insurance debate. The first part of the study will revisit consumption insurance in the presence of unintended health events. There are at least three important caveats to keep in mind when addressing this issue. A primary concern is how to find a proper health measure. A widely used health measure is self-reported health status. Despite the merit of this measure to predict subsequent mortality among adults and closely relate to productivity, self-reported measures of health are subject to measurement errors. Basically, this can happen due to different health valuations among individuals even though they have the same level of health in reality. The differences in socioeconomic status to some extent explain this health assessment gap. Interestingly, better educated and higher income persons are more likely to report that they have some health problems (Strauss and Thomas, 1995; Currie and Madrian, 1999; Lindeboom and van Doorslaer, 2004).

Gertler and Gruber (2002) suggest that limitations to perform activities of daily living (ADLs) provide a better alternative to reflect health changes since they are more objective. The two earlier studies that employ this health measure show that households in Indonesia are only able to smooth their consumption when they cope with mild health shocks, but they fail to smooth consumption against severer health risks (Gertler and Gruber, 2002; Gertler et al., 2009). Nevertheless, it is further confirmed that the ADLs measures are more suitable for older

populations (Genoni, 2012). For this reason, we complement the ADLs with two additional health indices, that is, illness symptoms and a drop in body mass index (BMI).

The next issue is related to the presence of unobservable variables leading to co-movement between consumption and health. For example, extreme drought may affect production and consumption, and it may also change health status because of the variation in the disease environment. A widely-accepted procedure for dealing with these problems is to include community fixed effects. Given the panel structure of our dataset, we also apply a fixed effect strategy to account for these omitted factors.

The last challenge is that the endogeneity of health itself. As pointed out by Gertler and Gruber (2002), the ADLs measures, however, can identify different types of acute exogenous health problems that are correlated with changes in labour market outcomes and consumption decisions. Therefore, these measures considerably do a good job in addressing the possibility of reverse causality between consumption and health.

While existing studies in this literature have largely focused on understanding the theory of risk-sharing within groups such households and communities, we add one important feature to distinguish this paper from them by examining the role of a social health insurance programme in protecting household consumption against health changes. In particular, we investigate whether beneficiaries of a social health insurance programme are protected from the negative effects of health shocks on the degree of consumption smoothing before and after the introduction of the programme. Therefore, our study relies on a difference-in-differences (DiD) approach.

To do so, we use the introduction of the Indonesian Askeskin in 2005, a publicly-financed health insurance programme for the poor. The programme was targeted to poor households. Beneficiaries of the programme are entitled to fully-subsidised health care services in primary health facilities and public hospitals. Given its very generous coverage, Askeskin can reasonably be expected to not only have an imperative effect on the consumption of medical care (Sparrow et al., 2013), but also on the consumption of other budget items, such as

transportation, electricity, and other costs related to the care of a sick household member at home (Wagstaff, 2010). This implies that the Askeskin programme could have an important role on consumption insurance during the health crisis.

The remainder of the paper is structured as follows. Section 2 discusses the formal model of risk-sharing and reviews some empirical evidence in this area. Section 3 describes health insurance systems in Indonesia and the Askeskin programme. Section 4 gives an overview of the Indonesian data and health measures. Section 5 discusses the estimation strategy and limitations of the study. Section 5 presents the main findings and a variety of sensitivity tests. Section 6 concludes.

2. Consumption Smoothing: Theories and Empirical Evidence

The model of consumption smoothing predicts that the level of household consumption solely responds to the realisation of aggregate risks instead of idiosyncratic risks (e.g. illness, changes in household income). While households still have to carry some risk, they share this exposure within their respective groups, implying that the marginal utility of consumption is strongly correlated across the groups. Achieving full consumption risk-sharing within a group (i.e. households or communities) or finding a Pareto efficient allocation of risk, however, is the main task of social planners because it is derived from the social planner problem.

Let us formalise our model as Cochrane (1991), Mace (1991), Townsned (1994), and Ravallion and Chaudhuri (1997). Basically, the model is built on the three following assumptions: preferences are additive over time and across households, consumption and leisure are separable, and discount rates are constant among households. Consider a community with J households, households' common information at time t is represented by the realisation of state of the world s_t with $s_t \in \{1,2,\dots,S\}$, and $\pi(s_t)$ denotes the probability that state s_t occurs. A social planner attempts to maximise a weighted sum of households' expected lifetime utilities as follows:

$$\max_{\{c_{jt}(s_t)\}} \sum_{j=1}^{J} \lambda_j \sum_{t=1}^{\infty} \sum_{s_t=1}^{S} \rho_t \, \pi(s_t) u_j\left[c_{jt}(s_t), \delta_{jt}(s_t)\right] \qquad (1)$$

where c_{jt} indicates the level of consumption of household j at time t, λ_j is the planner's weight of household j satisfying $0 < \lambda_j < 1$, $\delta_{jt}(s_t)$ represents a preference shock, and ρ_t is the rate of time preference.

The feasible budget constraint is that the aggregate community consumption has to be less than or equal to the aggregate community endowment (income) for each time and each state, or

$$\sum_{j=1}^{J} c_{jt}(s_t) \leq \sum_{j=1}^{J} y_{jt}(s_t), \forall_{s_t}, \forall_t \quad (2)$$

The Pareto-efficient allocation of risk within the community is solved by the standard optimisation of the first order conditions to yield a solution as:

$$\lambda_j u'[c_{jt}(s_t), \delta_j(s_t)] = \hat{\mu}_{(s_t)}, \forall_{s_t}, \forall_t \quad (3)$$

where $\hat{\mu}_{(s_t)} = \frac{\mu_{(s_t)}}{\rho_t \pi_{(s_t)}}$, and $\hat{\mu}_t$ is the Lagrange multiplier measuring the aggregate community constraints in period t. Therefore, given the Pareto weights and aggregate community consumption, the marginal utility is equalised across households.

Assume now that each risk-averse household has a constant absolute risk aversion (CARA) utility function as:

$$u_j[c_{jt}(s_t), \delta_{jt}(s_t)] = -\frac{1}{\sigma}\exp[-\sigma\big(c_{jt}(s_t) - \delta_{jt}(s_t)\big], \sigma > 0 \quad (4)$$

where σ is the Arrow-Pratt measure of constant absolute risk aversion. When we substitute equation (3) into (4) and take logarithms, it follows that the level of consumption of household j at time t is:

$$C_{jt}(s_t) = \left[-\frac{1}{\sigma}\right] log\hat{\mu}_{(s_t)} + \left[\frac{1}{\sigma}\right] log\lambda_j + \delta_{jt}(s_t) \quad (5)$$

The aggregation of equation (5) over all households in the community gives:

$$C_{jt}(s_t) = \bar{C}_t(s_t) + \left[\frac{1}{\sigma}\right]\left[log\lambda_j - \bar{\lambda}\right] + [\delta_{jt}(s_t) - \bar{\delta}_t(s_t)] \quad (6)$$

where

$$\bar{C}_t(s_t) = \frac{1}{J}\sum_{j=1}^{J} C_{jt}(s_t) \qquad \bar{\lambda} = \frac{1}{J}\sum_{j=1}^{J} log\ \lambda_j \qquad \bar{\delta}_t(s_t) = \frac{1}{J}\sum_{j=1}^{J} \delta_{jt}(s_t)$$

Alternatively, a more convenient way to express equation (6) is in the form of the first difference operator as:

$$\Delta C_{jt}(s_t) = \Delta\bar{C}_t(s_t) + [\Delta\delta_{jt}(s_t) - \Delta\bar{\delta}_t(s_t)] \quad (7)$$

The key implication of equation (7) is: when the assumption of full consumption insurance continues to hold, and we are able to control for the changes in the aggregate community consumption, idiosyncratic income risks that are uncorrelated with preference shifts should not determine the growth rate of household consumption.

A large number of empirical studies testing the above model show mixed results. A first strand of literature has reached a strong consensus that there is partial consumption smoothing (Townsend, 1994; Kochar, 1995; Skoufias and Quisumbing, 2005; Islam and Maitra, 2012). In contrast, some papers reject the model of full consumption insurance and suggest that households cannot manage to maintain their consumption constant in the face of health shocks (Dercon and Krishnan, 2000; Wagstaff, 2010; Beegle et al., 2008; Linnemayr, 2010). Another study highlights the heterogeneity of consumption smoothing

with respect to different economic strata and the degree of shocks. A study in rural China by Jalan and Ravallion (1999) concludes that wealthier households are better able to isolate the negative impact of health shocks than poorer households. Mohanan (2013) takes advantage of exogenous variation in exposure to health shocks due to bus accidents in India to reveal evidence of consumption smoothing for basic needs (food, housing, festivals) but this does not apply to education spending. His study which employs a quasi-experimental study design further shows that Indian households demand for borrowing and debt as the coping strategies to protect consumption from health shocks.

In the context of Indonesia, a pioneering paper by Gertler and Gruber (2002) confirms that households can only smooth consumption against mild health shocks, but they fail to smooth consumption in the presence of severe health risks. A recent study of Genoni (2012), however, has challenged these findings. She focuses on finding an exogenous source of variation in health and uses changes in the prices of health inputs as the instruments for the ADLs. This research points to the existence of full consumption insurance. She explains that this is made possible by intra-household labour substitution and inter-household transfers. The study warns that loosening the problems of reverse causality and omitted variables may result in different outcomes.

Gertler et al. (2009) extent Gertler and Gruber's analysis and question whether access to microfinance institutions helps households cope with serious health problems. They do emphasize the benefits of microfinance programmes in insuring consumption. Using different household survey datasets, Sparrow et al. (2014) strengthen these findings to conclude that poor households in rural areas of Indonesia rely on informal coping mechanisms when exposed to major health changes. Borrowing and depleting assets along with informal support from extended families become significant risk-sharing instruments among the poor.

That the informal risk-sharing arrangement plays a central role in household strategies raises some concerns about the effectiveness of formal health insurance programmes. This type of programmes could potentially crowd out the existing informal strategies and could make others worse-off. This becomes increasingly important if the implementation of the social health insurance programme does not

provide universal coverage. For instance, there are only some households from a private group-based informal risk-sharing arrangement fully covered by a social health insurance programme. These protected households have an incentive to break down the arrangement and leave unprotected households more vulnerable to shocks. Under the circumstances, a community base health insurance offers greater advantages than individual protection (Dercon, 2002).

3. The Indonesian Health Insurance System and Askeskin

The setting for our analysis is the Indonesian health insurance situation during the period 2000-2007. Prior to the National Social Security System reforms in late 2004, the Indonesian health insurance market targeted formal sector workers through the establishment of health insurance for both civil servants (Askes) and private sector employees (Jamsostek). Although the membership of Askes and Jamsostek is mandatory, these occupational health insurance schemes are not comparable in some aspects. Unlike Askes, Jamsostek does not cover catastrophic health treatments. The other special feature of Jamsostek is that it offers an opt-out clause. Therefore, private companies are allowed to utilise another scheme as long as it can provide (at least) equal protections as Jamsostek does. Based on the National Socioeconomic Survey (Susenas) data in 2007, it was reported that Askes and Jamsostek only covered about 6.00 per cent and 2.00 per cent of the population. Yet, this coverage is relatively large compared to the share of private insurance companies and other schemes, accounting for approximately 3.00 per cent of the population in the same period (Rokx et al., 2009).

Apart from the abovementioned health insurance programmes, the government of Indonesia, indeed, has also encouraged community participation in maintaining and financing their own health care. This effort has been promoted since the early 1970s by the introduction of a voluntary community-based health programme (known as Dana Sehat). Dana Sehat primarily covers farmers, fishermen, and students in the rural areas of Indonesia. The scheme allows households to pay the premium either in cash or in-kind to the bank or the committee of Dana Sehat. Since 1994, the central government has initiated to protect the poor by means of a health card programme, allowing card holders to obtain free services in all public health facilities. Following the 1997-1998 Asian economic crisis, a social safety net programme in the health

sector (known as JPS-BK) was launched. The JPS-BK programme provides free basic health care and finances various maternal and child health care services to eligible poor households (Hirose, 2008).

Under a new government's social security system flagship, Indonesia introduced a mandatory social health insurance for the poor (known as Askeskin) in 2005. The programme was intended to increase access to health care services for low-income families. Although the government fully subsidises the monthly premium of Rp. 5,000 (approximately USD 0.55) per participant, beneficiaries of Askeskin are entitled to very generous health care benefits. These include free outpatient primary care in the primary health centres (Puskesmas) and free inpatient care in the third class at a public hospital. It also provides special health care services, such as obstetric care services, mobile health services, immunisation, and pharmaceuticals. Askeskin was able to extend its health service coverage to reach remote areas and isolated islands of the country.

The selection of Askeskin beneficiaries used a combination of geographic (district) and individual targeting. The central government determined the Askeskin quotas for each district based on poverty data from the Central Bureau of Statistics (BPS). Village leaders took responsibility to trace the poor and proposed their names to the district governments. In other words, eligible individuals were selected at the district level in principle.

However, Askeskin was confronted with some difficulties in the initial phase of its implementation. For example, to identify eligible beneficiaries, some districts preferred to use the household welfare criteria suggested by the National Family Planning Coordinating Board (BKKBN) rather than the poverty criteria of BPS. Another concern is that people could use the JPS-BK health cards and village poverty letters (SKTM) to claim the Askeskin benefit package because of the delay in the distribution of Askeskin cards. Moreover, some individuals refused to take part in the programme because they had to bear some indirect costs (e.g. the cost of making a picture for the membership card) and had to undergo long-distance travel to reach health facilities (Sparrow et al., 2013).

In 2005, BPS renewed the database of poor households by conducting a social economics data survey (known as PSE-05). Poor households were classified on the basis of fourteen components, measuring different aspects of household well-being, such as housing materials, the use of sanitary systems, access to clean water, nutrient intake, ownership of durable assets, and labour force participation. A weight was assigned to each dimension. Subsequently, a household poverty index was calculated by summing up all those fourteen components. The possible index scores ranged from 0 to 1, where a value of 1 indicated the most impoverished households. In accordance with this new index, households were divided into four strata: very poor, poor, near poor and non-poor households wherein the first three groups were eligible for Askeskin.

Askeskin was targeted to cover 36.1 million poor people in the first year. In fact, it covered 60 million beneficiaries with the total actual costs amounted to approximately Rp. 3.6 trillion. Askeskin was renamed into Jamkesmas or health insurance for the entire population in 2008. It was estimated to reach about 35 per cent of the population (approximately 76.4 million beneficiaries). Jamkesmas, however, became the rudiment of the Indonesian universal health care by 2015 (Hirose, 2008; Rokx et al., 2009).

4. Data and Health Measures

We use the last two-wave panels of the Indonesian Family Life Survey (IFLS) in this study.[3] The IFLS is an ongoing longitudinal survey representing 83 per cent of the Indonesian population. The sampling design of the survey is stratified based on provinces and urban-rural areas. The sample consists of 321 enumeration areas that are randomly selected within 13 provinces. The random selection of households in each enumeration area makes use of a representative sampling frame from Susenas of the BPS.
The third wave of the IFLS survey administered in 2000 was able to contact over 10,400 households. This dataset serves as the baseline data for our study. In 2007, the IFLS4 survey successfully interviewed more

[3] We use additional data from the second wave of the survey to construct the health measures and the consumption variable.

than 13,500 households, retaining over 95 per cent of the households from the previous wave.

The IFLS collects detailed micro-level data at the individual and household levels. The consumption module, which records 37 food and 19 non-food items, makes great efforts in order to obtain accurate values of household consumption. Each household was asked explicitly to recall both monetary expenditures on these items and transactions involving consumption from own production. A new module collecting information on assistance from public transfer programmes helps us to identify beneficiaries of Askeskin.

The extensive documentation of the health module allows us to generate multiple health shock measures. The first measure is a dummy variable taking a value of 1 if the household head reported illness symptoms during the past 4 weeks of the survey. Our self-reported illness symptoms reflect not only minor health problems (e.g. headache, coughing, fever, etc) but also severer health problems (e.g. heart disease, diabetes, and hypertension). The change in illness symptoms will be 0 if the household head does not move from ill to healthy or *vice versa*, 1 if the household head shifts from reporting illness to not having any illness symptoms, and -1 if the household head changes his/her health valuation from healthy to ill.

A well-trained nurse records various measures of physical health for each household member, including his/her height and weight. This enables us to calculate a household head's body mass index (BMI), a more objective measure of health. It is equal to weight (in kilograms) divided by height (in metres) squared. We define a BMI shock if the heads' BMI changes exceed one standard deviation of the BMI-change distribution. We generate a dummy variable indicating that the head experiences a sizeable drop in BMI. As the variant of anthropometric measures, BMI is clearly related to energy intake which varies over the life course. It may capture both longer and shorter term dimensions of nutritional status. It has also been proven that BMI embodies the maximum physical capacity independent of energy intake. Hence, for some jobs that require sustained physical efforts, it is an important pathway through which health may influence worker's productivity. On the contrary, this claim seems to be less relevant for many jobs that do not need maximum physical efforts (Strauss and Thomas, 1998).

Our final health measure is a change in the index of activities of daily living (ADLs) which represents a change in a person's functional status.[4] It diagnoses 2 limitations in personal care (i.e. ability to bathe and dress) and 8 limitations in a range of motion activities (i.e. walk a kilometre and 5 kilometres; bow, squat, and kneel; sweep; stand up from sitting on the floor; get up from a sitting position on a chair; draw a pail of water; and carry a heavy load). The severity of each activity limitation is represented by three codes, a value of 1 denotes can do it easily, 3 if can do it with difficulty, and 5 if unable to do it. We generate a ADLs index for a person based on a scoring algorithm of the RAND Medical Outcomes Study (RAND-MOS) with the possible values ranging from 0 to 1.[5] It takes a value of 1 if the individual can perform all ADL items without any difficulties, and zero if the individual cannot perform any ADL items. A change in the ADLs index represents the change in the ADLs index value from the previous period.

5. Identification Strategy and the Limitation of the Study

The main hypothesis to be tested in this paper is whether households exposed to the Askeskin programme are better able to smooth their consumption against unexpected health shocks. The baseline empirical specification, thus, resembles the key idea of a difference-in-differences (DiD) model as follows:

$$\begin{aligned} C_{jct} = {} & \alpha + \beta_1 A_t + \beta_2 HI_{jc} + \beta_3 H_{jct} + \beta_4 (A_t * HI_{jc}) + \beta_5 (A_t * H_{jct}) \\ & + \beta_6 (HI_{jc} * H_{jct}) + \beta_7 (A_t * HI_{jc} * H_{jct}) + \sum_k \beta_8 X_{jct} \\ & + \varepsilon_{jct} \end{aligned} \quad (8)$$

where C_{jct} is the change in log (non-medical care) consumption per capita for household *j* in community *c* at time *t*.[6] A_t is equal to 1 when year is 2007. The dummy variable HI_{jc} is the participation status of the

[4] The fourth wave of the IFLS survey collected 13 ADL items, and 5 new items as the measures of the instrumental activities of daily living (IADLs). To maintain consistency, we only use 10 ADL items collecting in all survey rounds.

[5] The ADLs index for person i is calculated as the following: $Health_i = \frac{Score_i - Min\ Score}{Max\ Score - Min\ Score}$

[6] We deflate the nominal value of the consumption data by using the World Development Indicators's urban consumer price index series. It is in fixed 2005 prices.

household in the Askeskin programme. We define the treatment household if at least one member of the household is covered by Askeskin. The coefficient of β_3, measuring the idiosyncratic health shocks, should be equal to zero if there is consumption smoothing. In other words, health shocks will not affect the growth in consumption. β_4 captures the average treatment effect of Askeskin on consumption growth. The coefficient of β_5 indicates the further effect of health shocks for uninsured households. β_6 explains the differences in the change in consumption due to the variability in health shocks between beneficiaries and non-beneficiaries of the Askeskin programme. β_7 is the coefficient of interest. It measures whether participation in the Askeskin programme enables the household to better able to insure against health shocks. If the Askeskin programme does enhance benefits, the coefficient β_7 should be positive and statistically significantly different from zero. A vector of covariates to control for secular trends and seasonal variability, X_{jct}, includes the household head's and spouse's age and education, the change in household composition, and the agricultural household. The last term, ε_{ict}, is the error term.

Our first concern with estimating equation (9) is the presence of state dependency. If there is state dependency, the shape of the utility function and the consumption function will vary with health status despite in the state of full insurance. That is to say that the state of health is correlated with preference shifts and thus with the disturbance term, leading to biased coefficient estimates (Cochrane, 1991; Gertler and Gruber, 2002). Furthermore, Finkelstein et al. (2009) point out that the presence of state dependence could also lead to a false assessment of the true benefits of health insurance. In the case of positive state dependence, a decline in the marginal utility of consumption following negative health shocks (e.g. additional consumption on transport costs due to hospital visit), the benefits of health insurance would tend to underestimate the true benefits. In contrast, the overestimation of health insurance benefits would become plausible under negative state dependence. To test the likelihood of the shift in household preferences is due to the illness of the head, we include spouses' health measures in our model. We expect that the inclusion of these measures will not affect household consumption (Gertler and Gruber, 2002).

Another critical methodological challenge is the classical endogeneity problem in health status. Although our self-reported ADLs composite index is less prone to this simultaneity bias, the other subjective health measure (i.e. illness symptom) may offer better health assessments. The intuition is the following: while measurement errors in self-reported health bring a downward bias to the estimated coefficient on health, the endogeneity of self-reported health status tends to give an upwardly biased coefficient. Therefore, given the opposite direction of the bias, it will cancel each other out and yield a valid estimate of the coefficient (Bound, 1991). We combine both subjective and objective health measures to evaluate the consistency of our results.

A further exercise is devoted to examine income effect arising from the introduction of the Indonesian unconditional cash transfers programme (BLT henceforth) in the second semester of 2005. Since this social protection programme is also targeted to poor households, we anticipate any potential confounding effects between the two interventions by performing an additional analysis without including beneficiaries of BLT.

The aforementioned empirical strategy, however, leaves us with one major limitation because we are unable to hold the assumption of the DiD method. The validity of the difference-in-differences method rests on the assumption that the implementation of Askeskin is not driven by the pre-existing differences in the ability of households to insure their consumption against illness. This assumption is more likely to be violated in our context. Beneficiaries of Askeskin are the poor. By nature, this group is arguably more vulnerable to unexpected shocks. By directly comparing the outcomes of the two groups, our results would overestimate the true impact of the Askeskin programme. Yet the availability of the dataset prevents us from controlling for such differences in the pre-programme observable characteristics between the insured and uninsured groups.

6. Results

6.1 Sample Description

Before going further into the estimation results, we take a look at the data first. We restrict our sample to younger heads (below 66 years old) since they are more likely to actively participate in the labour market, and a serious illness will cause them to lose more income. Table 1 presents means, standard deviations for the characteristics of the sample. The data sets are presented for three groups: the entire sample, uninsured and insured households. The results of the table show a few differences between the characteristics of households with Askeskin and those are not. Specifically, households covered by the health insurance programme tend to have lower levels of non-medical consumption per capita, a larger household size, and approximately half of them are the recipients of the unconditional cash transfers programme (i.e. BLT). Looking at the characteristics of household heads and their spouses, lower levels of educational attainment and a less favourable change in body mass index for the insured group are also noticed. We raise some doubts about the validity of our self-reported illness symptoms because the lion's share of the two groups reported a change in illness symptoms between the two survey periods. Using a different data set, Gertler and Gruber (2002) also find that more than half Indonesian people reported an illness symptom in the survey. They conclude this evidence as an indication that people take into account many small health problems that do not need expensive medical treatment.

Table 1. Descriptive statistics of the characteristics of uninsured and insured households

Variable	All	Uninsured	Insured
log of HH non-medical consumption	6.5582	6.6242	6.2338
	(1.3531)	(1.3711)	(1.2106)
log of HH size	1.7644	1.7584	1.7940
	(0.3835)	(0.3845)	(0.3772)
Female head of HH	0.0111	0.0102	0.0157
	(0.1049)	(0.1004)	(0.1245)
HH covered by BLT	0.1910	0.1277	0.5021
	(0.3931)	(0.3338)	(0.5004)
Head's characteristics:			
Age	47.0375	46.8874	47.7754
	(8.9287)	(8.9153)	(8.9644)
The highest level of education: primary school	0.5155	0.4905	0.6381
	(0.4998)	(0.5000)	(0.4809)
The highest level of education: lower secondary school	0.0851	0.0864	0.0787
	(0.2791)	(0.2810)	(0.2694)
The highest level of education: upper secondary school	0.1632	0.1760	0.1001
	(0.3696)	(0.3809)	(0.3004)
The highest level of education: tertiary school	0.0670	0.0774	0.0157
	(0.2500)	(0.2673)	(0.1245)
Work in agriculture	0.3835	0.3713	0.4435
	(0.4863)	(0.4832)	(0.4972)
Health status measures:			
Change in ADL index	0.0025	0.0022	0.0038
	(0.0851)	(0.0840)	(0.0903)
BMI drop	0.3482	0.3360	0.4077
	(0.4764)	(0.4724)	(0.4918)
Change in illness symptoms	0.7427	0.7402	0.7554
	(0.4372)	(0.4386)	(0.4302)
Spouse's characteristics:			
Age	41.8066	41.7713	41.9800
	(9.3340)	(9.2907)	(9.5491)
The highest level of education: primary school	0.5172	0.4993	0.6052
	(0.4998)	(0.5001)	(0.4892)
The highest level of education: lower secondary school	0.0962	0.1021	0.0672
	(0.2949)	(0.3029)	(0.2506)
The highest level of education: upper secondary school	0.1151	0.1283	0.0501
	(0.3192)	(0.3345)	(0.2182)
The highest level of education: tertiary school	0.0418	0.0474	0.0143
	(0.2002)	(0.2126)	(0.1188)
Health status measures:			
Change in ADL index	-0.0086	-0.0088	-0.0077
	(0.0932)	(0.0906)	(0.1053)
Observations	4136	3437	699

Notes: N=4136. Non-medical consumption is in Rupiah. Mean from IFLS3 and IFLS4. Standard deviations are in parentheses.

We now turn our attention to the patterns of health care expenditures. Households with critical and immediate medical needs have to spend a large share of their budget for health care if they are not covered by any health insurance programmes. Table 2 shows that the budget share of health care expenditure raises with the average monthly total household expenditure, implying a positive income elasticity of health expenditures.[7] It is further revealed that the share of health care expenditures across expenditure quintiles fairly decreased between 2000 and 2007 (from 1.97 per cent to 1.89 per cent respectively). There are at least three main reasons to explain this finding. First, perhaps the growth in non-medical expenditure was faster than the growth in medical expenditure. Second, there was a substantial decline in health care spending. Since it is the product of prices and quantities, this reduction means that households pay lower prices (a price effect) due to the Askeskin intervention. Lastly, this indicates that households either utilise less health care services or, very unlikely, experience less illness.

Table 2. The distribution of monthly health expenditures by expenditure groups (percent)

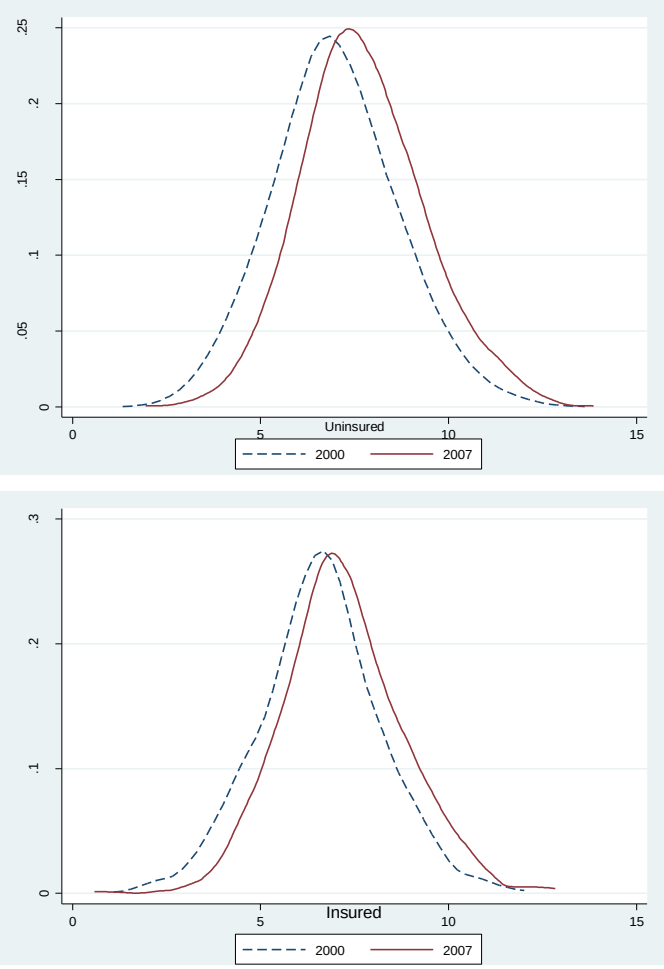
	percent of total expenditure		**percent of non-food expenditure**	
	2000	2007	2000	2007
Quintile1(poorest)	1.342	1.351	3.829	3.943
Quintile2	1.899	1.538	4.719	4.075
Quintile3	2.005	1.598	4.459	3.856
Quintile4	2.38	2.028	4.993	4.375
Quintile5 (richest)	3.443	2.485	5.39	4.658
Rural	1.708	1.92	4.43	4.579
Urban	2.117	2.022	4.434	3.976
Total	1.97	1.888	4.431	4.281

To have a clearer view of the trend in the health care expenditures around the reform, Figure 1 gives the plots of health care expenditure per capita before and after the introduction of Askeskin between the uninsured and insured groups. The two figures show that the

[7] In low-income countries, it is more preferable to express financial burden of health as the share of non-food instead of food expenditures because the latter accounts for a large fraction of the poor's consumption basket (O'Donnell et al., 2007).

distributions of health care expenditure per capita for all households have markedly shifted to the right after the reform, signifying an increase in the demand for health care services. Nevertheless, the pattern has been less obvious for the insured group in the bottom of the health expenditure distribution.

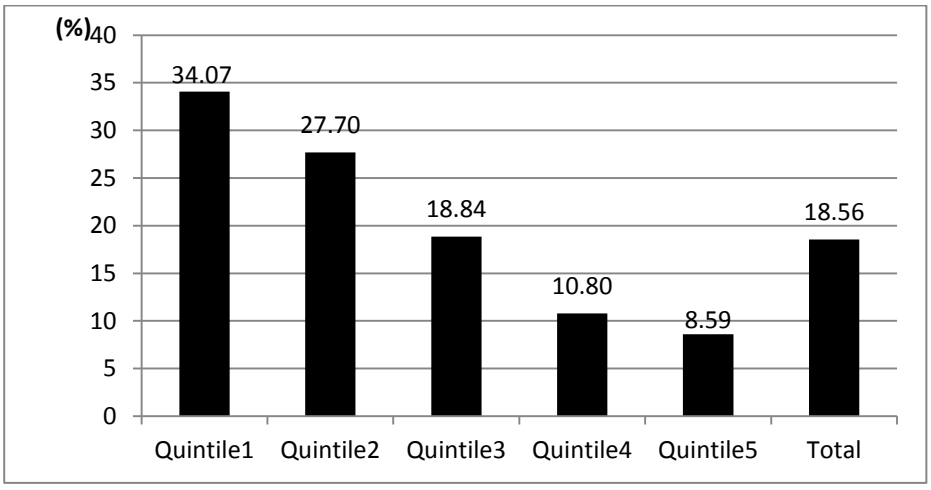
Figure 1. Density of (log) health care expenditures per capita of the uninsured and insured groups before and after the Introduction of Askeskin



Having discussed Indonesian experience with the household health expenditure patterns, we now evaluate whether the targeting system of Askeskin has accurately identified its beneficiaries. Although it is not perfect, the targeting method of Askeskin is considerably successful in

selecting its beneficiaries. In 2007, Askeskin covered 61.77 per cent of the first two poorest consumption quintiles. Nevertheless, there were also sizeable leakages of benefits to the non-poor, about 8.59 per cent (Figure 2). Households in rural areas enjoyed higher coverage rates as compared to households in urban areas, about 10.59 per cent as opposed to 7.97 per cent. Overall, Askeskin was estimated to cover at around 18.56 per cent of the entire sample.

Figure 2. Askeskin coverage by consumption quintile in 2007



6.2 Baseline Results

The basic consumption smoothing results are presented in Table 3. Let us focus first on the results for the ability of households to insure their consumption against health shocks. The coefficients on the three health measures are statistically insignificant, suggesting the existence of full insurance. Although the evidence does not contradict the full insurance model, the coefficient on illness symptoms does not show the expected sign, that is to say an illness is associated with higher levels of consumption (column 2). The finding is remarkably consistent with that reported by Gertler and Gruber (2002) based on a different Indonesian data set. They argue that the change in self-reported illness symptoms is weakly correlated with the change in labour-supply, and it is, therefore, unlikely to have any effects on household consumption. Households remain able to smooth their consumption as a result of large reductions

in BMI. Specifically, a drop in BMI would lower consumption by almost 3.67 per cent on average.

The last two columns of Table 3 examine the impact of ADLs changes on the change in household consumption. We replicate a similar model as Gertler et al. (2009) in column 4. We find that the coefficient on the ADLs index is 0.08. This implies that if an illness causes the household head to move from being able to perform all physical activities to being able to perform none of them, consumption would decrease by 7.84 per cent. Our result poses a challenge to the estimate of Gertler et al. (2009) which concludes that households are unable to insure their consumption as a result of the changes in ADLs. In particular, they find that households would reduce their consumption by almost 22 per cent. This noticeable difference could be related to the fact that Gertler et al. (2009) use the data sets collected during the financial crisis, in which it brought down the purchasing power of households. Our argument seems to be supported by Beegle et al. (1999). Utilising the same data source, their study shows unambiguous evidence that the crisis caused substantial declines in the level of household expenditure.

Table 3. Effects of heads' health shocks on changes in non-medical consumption and mitigation by Askeskin

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
post05	0.248***	0.305***	0.282***		0.249***
	(0.0494)	(0.0946)	(0.0661)		(0.0535)
Insurance	-0.265***	-0.0656	-0.244**		-0.205***
	(0.0782)	(0.165)	(0.102)		(0.0779)
post05* insurance	-0.0947	-0.225	-0.141		-0.0836
	(0.104)	(0.204)	(0.138)		(0.104)
ADL				0.0784	0.121
				(0.252)	(0.385)
ADL*insurance					-1.050
					(0.847)
ADL*post05					0.0221
					(0.530)
ADL*insurance*post05					1.444
					(1.162)
BMI			-0.0367		
			(0.0688)		
BMI*insurance			0.0594		
			(0.157)		
BMI*post05			-0.119		
			(0.103)		
BMI*insurance*post05			0.217		
			(0.218)		
Symptom		0.121			
		(0.0815)			
Symptom*insurance		-0.195			
		(0.186)			
Symptom*post05		-0.0654			
		(0.106)			
Symptom*insurance*post05		0.192			
		(0.238)			
Constant	6.495***	6.272***	6.402***	6.315***	6.372***
	(0.0336)	(0.531)	(0.533)	(0.533)	(0.531)
N	4,136	4,136	4,136	4,136	4,136
R-squared	0.150	0.176	0.176	0.171	0.175

Notes: N=4136. Robust standard errors are in parentheses (clustered at the household level). All specifications are robust to the inclusion of covariates.
*** p<0.01, ** p<0.05, * p<0.1

Regardless of its imprecision, however, we should carefully interpret the coefficient of ADLs. The ADLs measures were originally developed to assess the health status of older adults. It is still an open question

whether the ADLs index is also relevant to studying the health conditions of younger populations. This is a very plausible reason since both groups react in different ways to health shocks. It is generally accepted that older individuals tend to experience more severe and more permanent health problems than younger persons. Furthermore, the ADLs index cannot precisely differentiate illness events in terms of their duration and severity, whereas these will lead to distinctive adjustment mechanisms. For instance, a transitory health shock is more likely to be insured than a longer-term illness because the former could just imply temporary reductions in labour supply. In a similar way, persons who report the same limitations in the ability to carry a heavy load for 20 metres may suffer from very different types of illness (Genoni, 2012).

We now turn to the impact of the Askeskin programme. The interaction between the dummy for the health insurance programme and the post-reform dummy represents the treatment effects of Askeskin. According to the table, we obviously see that the impact of the programme on the consumption growth is not statistically different from zero. Before controlling for covariates, the difference-in-differences estimate shows that the beneficiary households had close to 9.47 per cent lower consumption growth than the non-beneficiary households. This implication remains consistent with the inclusion of the health measures. Notably, those who reported changes in illness symptoms seem to have been strongly adversely affected than the two other illnesses, in particular there would be a smaller rate of consumption growth with 22.50 per cent for the Askeskin beneficiaries.

Moving on to the role of Askeskin in enabling households insure against idiosyncratic health shocks. The mitigating effect of Askeskin on health shocks is captured by the interaction terms between the dummy for the treatment effect and each health shock measure. The results show that Askeskin has a trivial role in mitigating these adverse health shocks. However, it is notable that the estimated coefficients are all positive, suggesting that the participants of Askeskin have a greater ability to protect their consumption during illness. These findings are robust to the inclusion of our three health shock measures.

6.3 Tests for State Dependency and the Confounding Effects of the Unconditional Cash Transfers (BLT)

As noted earlier, the model of consumption smoothing will be held if there is no state dependency, to the extent that health shocks will not change the underlying preferences of other household members. In our case, the illness of the head could be associated with the illness to other household members. Hence, the changes in household consumption refer to the wide changes in household tastes. We test this hypothesis by incorporating in our model a change in the ADLs index of the spouse. The inclusion of the change in the spouse's ADLs index has neither effects on consumption nor substantial changes in the coefficient on the head's ADLs index. The coefficient on the spouse's ADLs index is not statistically significant, whereas the coefficient on the change in the head's ADLs is still insignificant despite its magnitude decreases by almost half from 0.12 to 0.07 (Table 4 column 1). The evidence should not be surprising because the correlation coefficient between the illness of the head and the illness of the spouse is very low, around 0.06. The data discussion implies that the state dependency is not driving our findings.

An alternative explanation of our baseline results could be derived from the confounding effects of the unconditional cash transfers (i.e. BLT) programme. This anti-poverty program was launched a few months following the commencing of Askeskin and shared identical targeting systems. To isolate the potential spill over effects of BLT, we exclude BLT-eligible households and re-estimate our models. We find that the coefficients on Askeskin are still insignificant, but they fall noticeably. As compared to the treatment effects from the baseline estimates (9.47 per cent and 8.36 per cent), it currently varies between 4.16 per cent to 6.14 per cent (Table 4, column 2 and 3).

Table 4. Tests for state dependency and confounding effects of BLT

Variable	**(1)**	**(2)**	**(3)**
post05	0.273***	0.294***	0.270***
	(0.0638)	(0.0539)	(0.0588)
insurance	-0.151*	-0.218**	-0.137
	(0.0862)	(0.101)	(0.102)
post05*insurance	-0.258**	-0.0416	-0.0614
	(0.123)	(0.148)	(0.148)
ADL	0.0677		0.162
	(0.533)		(0.406)
Spouse's ADL	-0.449		
	(0.367)		
ADL*insurance	-0.981		-1.828*
	(0.858)		(1.079)
ADL*post05	0.224		-0.100
	(0.819)		(0.598)
ADL*insurance*post05	0.354		3.133
	(1.449)		(2.044)
Constant	6.137***	6.549***	6.259***
	(0.657)	(0.0352)	(0.579)
N	3,134	3,346	3,346
R-squared	0.206	0.165	0.189

Notes: Robust standard errors are in parentheses (clustered at the household level).
*** p<0.01, ** p<0.05, * p<0.1

This finding provides a rough sketch of the evidence that the BLT programme also partly contributes to the growth of household consumption. Another aspect of the result is that household consumption is more sensitive to the income effects of BLT than of Askeskin: without controlling for the health shocks covariates, the treatment effect of Askeskin decreases dramatically by 5.31 per cent (i.e. 9.47-4.16).[8] Nonetheless, we cannot disentangle the channel through which this impact occurs. Perhaps the income support component of the BLT programme which constitutes an additional in unearned non-labour income induces a pure income effect and ultimately loosens the budget constraint of the beneficiary households. The second channel may work through labour supply. Assuming that leisure is a normal good for the beneficiaries, the transfers possibly will produce a reduction in labour supply within the participant households. From this direction, we

[8] We also perform a supplementary analysis to test the impact of BLT on the change in household consumption. We find that the effects of BLT are insignificant but somewhat larger than that of Askeskin. The results are not reported here.

understand that the net effect of the programme is ambiguous. Yet this relationship is not well-established in developing countries.

6.4 Geographic Disparities: Urban and Rural Areas

So far we have seen that Askeskin cannot completely protect household consumption. A seminal contribution in the health policies literature by Filmer et al. (2000) sheds light on the weak links that may explain the ineffectiveness of health policy interventions in developing countries. One possibility is that the public spending is not enough allocated to the intervention itself (such as a limited number of health providers) and because of highly-fragmented public health infrastructure which its availability is concentrated in urban areas of the country (World Bank, 2007). Another channel is due to a low quality of health care services *per se*. A stark example of this claim is the lack of professionalism among health care professionals (e.g. noncompliance with health standards and protocols and high rates of absenteeism among the health care workforce). Intriguingly, Chomitz et al. (1998) elucidate that the real problem in Indonesia also involves the difficulty in staffing (i.e. a very high number of unfilled positions for rural health workers).

To deal with this issue, we run two separate regressions, one for the urban sample and one for the rural sample. Table 5 displays the findings. The treatment effect of Askeskin for the urban area demonstrates that the consumption growth of the beneficiary group is approximately 2.87 per cent lower than the non-beneficiary group (column 1). By contrast, it is almost 9.76 per cent for the rural area (column 2). Nevertheless, the findings suggest that the impact of Askeskin is not statistically different from zero for both groups.

There are contradictory effects of Askeskin on insuring household consumption from health shocks. Considering an illness shock one at a time, Askeskin does completely protect the consumption changes arising from the ADLs changes of urban household heads. Conversely, for the rural sample, any illness that affects a head's ability to function physically, such as receiving an Askeskin benefit, has not received full protection, but the coefficient gives the wrong sign.

Table 5. Heterogeneity tests: urban-rural sample

Variable	**(1)**	**(2)**
post05	0.338***	0.163**
	(0.0827)	(0.0778)
insurance	-0.191	-0.219**
	(0.123)	(0.102)
post05*insurance	-0.0287	-0.0976
	(0.162)	(0.143)
ADL	0.256	0.290
	(0.635)	(0.446)
ADL*insurance	-2.224**	0.0212
	(1.016)	(1.256)
ADL*post05	-0.411	-0.0104
	(0.753)	(0.861)
ADL*insurance*post05	3.657**	-0.227
	(1.653)	(1.756)
Constant	5.492***	6.628***
	(0.846)	(0.710)
N	1,892	2,244
R-squared	0.260	0.146

Notes: Robust standard errors are in parentheses (clustered at the household level).
*** p<0.01, ** p<0.05, * p<0.1

What we have learned from our econometric results? *A priori*, the urban-rural treatment effect differences could be attributable to supply-side problems. There is a long-standing issue that rural areas in developing countries are commonly characterised by inadequate and inferior quality of health infrastructure or difficulties in reaching health facilities. In such settings, the beneficiaries of a social health insurance programme are more likely to bypass the benefits of the programme and try to find treatment elsewhere (e.g. self-treatment, general medical practitioners, etcetera). By doing this, households have to finance their own health spending, and this may have serious economic consequences, including a change in their consumption patterns.

7. Conclusion

This paper has re-examined the theory of consumption smoothing and has investigated whether a rapid expansion of social health insurance in Indonesia protects household consumption when they are exposed to unexpected health shocks. Three measures of health shock are employed: a change in illness symptoms, a drop in body mass index, and a change in activities of daily living index.

The evidence does not contradict the hypothesis of consumption insurance, stating that households are able to insure their consumption against the negative effect of health shocks. These findings are robust to various health measures and different specifications. We interpret these results as a indication that there are well-functioning of informal insurance within a community in Indonesia. However, there remains a fundamental question of how households in those communities can manage to keep their consumption smooth in the presence of illnesses. Studying strategies used by households to isolate a certain type of idiosyncratic health risks will be a fruitful area for future research.

Another important feature of this study is the treatment effects of Askeskin. Our findings demonstrate a marginal effect of Askeksin on the growth of household consumption. The result also confirms that the programme gives a stronger impact on a change in consumption patterns of urban beneficiaries. To be precise, the role of Askeskin in protecting household consumption during illness episodes suggests that it can only protect urban households. How could such targeted demand-side intervention perform far below expectations? A classic explanation will point to the supply-side problems. Just like any other developing countries, rural areas of Indonesia commonly experience the lack of quality and quantity of health infrastructure which contributes to low utilization of health care services among the population. Under these settings, a social health insurance programme cannot effectively improve health service usage. Thus, strengthening supply-side interventions is supposed to be the prerequisite condition for enhancing the benefits of the social health insurance programme. Yet, a comprehensive study on this issue is needed to reveal weak links in the chain between the availability of health infrastructure and the effectiveness of demand side interventions.

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