World Development 104 (2018) 212–221

Contents lists available at ScienceDirect

World Development

journal homepage: www.elsevier.com/locate/worlddev

Crowding out of solidarity? Public health insurance versus informal transfer networks in Ghana

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ARTICLE INFO

Article history:
Accepted 3 November 2017

JEL classification:
I13
I15
O12

Keywords:
Public health insurance
Informal transfer networks crowding out
Ghana

ABSTRACT

This paper delivers empirical evidence on how transfers that serve as an informal insurance mechanism are affected by a formal and country-wide health insurance scheme. Using the fifth and fourth waves of the Ghanaian Living Standard Household Survey, we investigate the extent to which the implementation of the National Health Insurance Scheme affects health-related outcomes and making or receiving informal transfers. Our findings suggest that there is a reduction of out-of-pocket expenditures for health services and a significant crowding out of informal transfers. We conclude that the provision of formal health insurance does not only relieve ill individuals from out-of-pocket expenditures, but also their network partners from making informal transfers.

1. Introduction

In the developing world individual access to health services is largely determined by income. In order to be able to afford treatment costs in the case of illness, many poor households rely on informal transfers within networks of relatives or neighbors. These support schemes are important and beneficial since the risk to become sick can be shared with other members of the network (Fafchamps, 2008). The individual engagement in an informal transfer network is usually determined by two main motives, altruism and reciprocity (Leider, Möbius, Rosenblat, & Do, 2009). Altruism can be described as a preference for contributing without expectations to be rewarded, whereas reciprocity is based on an exchange motive with the prospect of future benefits (Ligon & Schechter, 2012). The theoretical literature has emphasized that such non-altruistic sharing arrangements should be self-enforcing. Individuals are willing to help others facing a temporary shock because of the credible promise of reciprocity in the future. Thus, these support schemes can be a crucial mechanism of insurance in times of severe hardship (Tsai & Dzorgbo, 2012), and support individuals regularly during weaker stages of their life, e.g. when they are young or very old (Kabki, 2007).

However, these networks can provide inadequate protection if many members are suffering from economic hardships or refuse to contribute because of personal conflicts (Morduch, 1999; Townsend, 1994). Furthermore, as especially kinship networks are often characterized by strong sharing obligations, productive network members are confronted with the demand for transfers by less productive relatives (Di Falco & Bulte, 2011; Hoff & Sen, 2005; Platteau, 2000). This implies that redistributive pressure can adversely affect incentives of network members that own an enterprise to invest in their business (Grimm, Hartwig, & Lay, 2016) or to save beyond a certain amount (Brune, Giné, Goldberg, & Yang, 2015; Duflo, Kremer, & Robinson, 2011; Wahhaj, 2010). Thus, adverse incentives prevent members from improving their economic situation and may be an important obstacle in the process of economic transition.

In order to overcome the imperfections of informal transfer networks and to help productive individuals such as enterprise owners to develop their full economic potential, formal health insurance schemes or micro-insurances are recognized as an important remedy (Landmann, Vollan, & Frölich, 2012). In recent years, some developing countries introduced country-wide health insurance schemes, while in other developing countries many micro-insurance initiatives were launched with the aims to improve access to health care services and to complement informal insurance mechanisms (Shigute, Strupat, Burchi, Alemu, & Bedi, 2017). While there is already some empirical evidence that

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https://doi.org/10.1016/j.worlddev.2017.11.004
0305-750X/

suggests a crowding out of informal mechanisms after receiving public transfers (Dercon & Krishnan, 2003; Oruč, 2011; Pavan & Colussi, 2008), only few studies exist on the relationship between formal insurance and informal transfer networks.[1]

Attanasio and Rios-Rull (2000) provide theoretical and empirical evidence that formal insurance crowds out informal insurance and potentially increases welfare in Mexico. Landmann et al. (2012) implement an experiment in the rural Philippines and show that formal insurance can lead to lower voluntary transfers among network members. In a laboratory experiment, Lin, Liu, and Meng (2014) find that the introduction of formal insurance significantly crowds out private transfers and reduces income inequality. In a lab-in-the field experiment in Cambodia, Lenel and Steiner (2017) find a reduction in transfers, driven by availability of insurance, even when recipients do not become formal insurance members. They conclude that solidarity can potentially be crowded out by the mere existence of insurance. Cecchi, Duchoslav, and Bulte (2016) explore how the implementation of a micro-health insurance affects the results of a public good game in rural Uganda. They find that average contributions to the public good are lower in areas with access to formal insurance and conclude that formal insurance schemes have the potential to crowd out social capital.

As none of these studies have investigated the effect of a formal and country-wide health insurance, this paper delivers the first empirical evidence on whether informal transfers are affected by such scheme. Closing the knowledge gap on the effects of a health insurance scheme at scale is of critical importance because the vast majority of people in the developing world will fall under such schemes in the future. The launch of the Ghanaian National Health Insurance Scheme (NHIS) in 2003, coupled with differences in the implementation between local districts, makes Ghana an ideal setting for examining the relationship between formal health insurance and informal transfer networks. Furthermore, we can investigate the detailed mechanism behind household's decision to engage in informal transfer networks and use data on health-related outcomes such as health status and out-of-pocket payments for health purposes.

For our analysis, we collect the exact NHIS implementation dates of 90 districts and find that the health insurance scheme has been implemented by most district authorities at the end of 2005.[2] We combine this information on implementation dates with the 1998/1999 and 2005/2006 waves of the Ghanaian Living Standard Household Survey (GLSS) that cover the same 90 districts. The districts in this cross-sectional household surveys contain enumeration areas (which we call sub-districts in the following) that were interviewed in different months during a 12 month survey period.[3] Thus, we are able to observe the districts in the 2005/2006 wave before and after the implementation of the NHIS which allows us to observe different individuals from the same districts at three points in time: before the NHIS implementation in 1998/1999 (round 1), before the NHIS implementation in 2005/2006 (round 2) and after the implementation of the NHIS in 2005/2006 (round 3).[4] Hence, in our empirical approach we exploit the panel dimension of the data by estimating a district fixed effects model that controls for time-invariant unobserved characteristics of the districts. Furthermore, we are able to employ placebo regressions by using the first two rounds of our data, in order to check whether there are any differences in outcome variables between districts with and without the NHIS over time before the implementation of the NHIS.

We find that the introduction of the country-wide formal health insurance scheme leads to a substantial crowding out of informal transfers. The implementation of the NHIS decreases the probability and the amount of made and received transfers. These results are consistent with the empirical literature we discussed and corroborate our theoretical framework (outlined below). Turning to the analysis of health-related outcomes, we find that the NHIS reduces out-of-pocket expenditures of the respondents. Thus, our results suggest that not only sick individuals benefit financially from the NHIS, but also network partners are financially relieved after the implementation of the NHIS.

The remainder of this paper is organized as follows. Section 2 introduces the theoretical framework of our study and provides information about the National Health Insurance Scheme in Ghana. In Section 3 we describe the data and give details on our identification strategy. Section 4 presents the results and further robustness checks before Section 5 concludes with a summary of the main findings and a research outlook.

2. Theoretical framework and the National Health Insurance Scheme in Ghana

2.1. Theoretical framework

In Ghana, reciprocity is widely practiced and often necessary in order to reduce economic insecurity, building trust and solidarity within transfer networks (Udry & Conley, 2004). From an economic point of view, reciprocity can be described as an exchange motive with respect to future benefits (Ligon & Schechter, 2012) which drives the formation of transfer networks as an informal institution and provides signals for being trustworthy and also can foster someone's social status. In Ghana transfer networks consist to a large extent of relatives, forming kinship networks in which reciprocal transfers are used to constitute responsibility and obligations between network members. These networks can be a crucial mechanism of insurance in times of severe hardship (Tsai & Dzorgbo, 2012), but also can support individuals regularly during weaker stages of their life, e.g. when they are young or very old (Kabki, 2007). Thus, reciprocity is an important driver for participating in informal transfer networks in Ghana, either due to direct financial benefits (risk sharing) or indirect benefits by an increased social status within a community.

Against this background, our theoretical framework assumes that an individual's engagement in an informal transfer network is determined by the exchange motive (reciprocity). In line with Morduch (1999), the model contains two individuals that form a transfer network within a framework of repeated interactions over time. Both individuals will contribute to the network until one individual reneges on the arrangement. Hence, a trade-off between leaving the network today and future benefits from further participation exists. A rational individual will make a cost-benefit analysis considering components, that affect the decision to stay in the network such as (future) benefits of the reciprocal arrangement in terms of received transfers, and costs that are determined by (current) transfer payments to the network partner. Furthermore, the decision to stay in the network depends on opportunity costs: On the one hand, a formal insurance scheme can be interpreted as a possible (partial) substitute to informal insurance. Potential exit costs of leaving the network as discussed by Hoff and Sen (2005) & Di Falco and Bulte (2011) contribute negatively to opportunity costs of staying in the network, on the other hand.

[1] Although solidarity can be seen as a prerequisite for the existence and functioning of a public health insurance scheme, this is not the focal point of our paper. Instead, we solely analyze informal transfer networks on a micro level which are known to be driven by sharing motives such as reciprocity.

[2] Membership in the health insurance scheme is voluntarily for all adults (age 18–69) that work in the informal sector and enrollment rates increased substantially between 2005 and 2007 from 6 to 37 percent of the population (NHIA, 2009).

[3] In the 2005/2006 wave of the GLSS every district consists on average of four sub-districts.

[4] As most of the treatment districts implemented the NHIS at the end of 2005 and the survey period ends in September 2006, the average exposure to the scheme is 8 months.

With regards to these components, the decision to stay in the network is negatively correlated with opportunity costs due to available formal insurance and (current) transfer payments. In contrast, it is positively correlated with the expected benefits and the exit costs for leaving the network. If, for example, transfer payments to the network partner are low and the expected benefits of this reciprocal arrangement are high, the individual will stay in the network. After the introduction of a formal insurance, new opportunity costs can change this decision if overall costs (including these opportunity costs) exceed expected benefits. Thus, the main message is that other insurance mechanisms can lower the value attached to informal sharing arrangements.

In what follows, we assess whether the availability of the NHIS in Ghana affects informal network participation on the extensive and intensive margin, for both making and receiving transfers.

2.2. The National Health Insurance Scheme in Ghana

The law on the National Health Insurance Scheme passed the Ghanaian parliament in 2003 and was successively implemented at the district level until the end of 2006. The NHIS is monitored and regulated by the National Health Insurance Authority (NHIA). The NHIA licensed District Mutual Health Insurance Schemes (DMHIS) that were established by the district authorities to collect a sufficient amount of insurance premiums in order to meet the expected health care claims within each district. As the ability of the district to set up a DMHIS and the acceptance of the health insurance varied between districts, the health insurance scheme has been implemented at different dates, where most district authorities launched the scheme in 2005 and 2006.[5]

The aim of the scheme was to provide health care services to a broad part of the population and to establish an alternative to the existing 'cash and carry' system. The insurance covers general outpatient and in-patient services, oral health, eye care, emergencies and maternity care, including prenatal care, normal delivery, and some complicated deliveries, as well as treatment for malaria, diarrhea, upper respiratory tract infections, skin diseases, hypertension, asthma and diabetes (Mensah, Oppong, & Schmidt, 2010). The covered health services are mainly financed by a health insurance levy (a 2.5% addition to the value added tax), the payment of insurance premiums and allocated money from the government.

The membership in the health insurance scheme is voluntarily for all adults (age 18–69) that work in the informal sector such as self employed individuals, while for formal sector employees membership is mandatory and insurance premiums are deducted from their monthly payrolls. The income-related insurance premium varies between a minimum of 7.2 Ghana Cedis (GHC) (US $3) and a maximum of 48.0 GHC (US$19) and must be paid on an annual basis.[6] All children less than 18 years whose parents have enrolled with the scheme and all people aged above 70 years are covered by the insurance, but are exempted from paying premiums.

3. Data and identification strategy

3.1. Data description

For our analysis we use the 4th and 5th wave of the Ghana Living Standards Survey (GLSS), which are based on interviews conducted by the Ghana Statistical Office and the World Bank during the period from October 1998 until September 1999 and from October 2005 until September 2006. These nation-wide surveys contain nationally representative samples of households that cover the same 90 districts across both waves. The surveys include all major socio-economic variables measured at the individual and household level.

Our treatment variable is a binary indicator representing the availability of the NHIS in an individual's district. In order to construct this variable, we collect the exact implementation dates of the NHIS at the district level by contacting district officials and using district specific media reports about the health insurance.[7] Fig. 1 shows how the NHIS implementation evolved over time and districts. As most districts implemented the NHIS at the end of 2005 and the survey period ends in September 2006 (see dashed line), the average exposure to the scheme is 8 months. 77 districts implemented the scheme until September 2006, while 13 districts introduced the scheme afterwards.

Fig. 2 presents the enrollment with the NHIS. 19 percent of the population have been enrolled with the NHIS at the end of 2006 (NHIA, 2009). Regional differences in enrolment rates are wide and range from 24.6% in the central region to 50.9% in the upper west region.

As measures for participating in reciprocal transfer networks, we define variables that show whether household members make and receive regular transfers in the form of money or goods on a weekly, monthly or quarterly basis within Ghana. In addition, we also use information on the amount of made and received transfers. We sum up all monetary values to an annual amount since it simplifies comparisons with other financial information that are provided on an annual basis. Regular transfers include no labor compensation for extended family members or neighbors that work in a business of the household. Most of these transfers were made within inner family networks, especially own children/parents (50 percent) and extended family members such as grandparents, cousins and aunts (15 percent) received money or goods, while making transfers to non-relatives is less pronounced (35 percent). We also have information on the purposes of making and receiving regular transfers. 58 percent indicate 'health' as one of the first two purposes for making and receiving regular transfers. However, as this question depends fully on the individual self-assessment relating the use of transfers and has been only asked in the 5th wave of the GLSS, we stay with the general information on transfers.

In order to explore whether the NHIS is effective in achieving its primary purposes i.e. reduce out-of-pocket payments, improve access to formal health care and improve health status, we also examine the impact of the NHIS on health-related outcomes such as the probability that the respondent was sick over the last two weeks, the number of sick days during the last two weeks and annual out-of-pocket expenditures for medical services.

We focus in our analysis on all individuals who are not exempted from premium payments, i.e. all adults (age 18–69) that work in the informal sector. As 42 percent of all households did not provide information on both transfer variables, we investigate the impact of the NHIS implementation on made and received transfers separately.[8] We do not know the exact reason why households have reported only one of the two categories of transfer. However, as it has been discussed in the recent literature on informal transfer behavior that self-reported transfer data typically display a high rate of discrepancy in survey responses (Comola & Fafchamps, 2017). These discrepancies are often due to those who receive transfers

[5] In some districts mutual health insurance schemes have been established already before the launch of the NHIS. Furthermore, in some districts it took some time until the NHIS was fully operational. Unfortunately, we do not have further information that indicate in which districts it took place.

[6] These insurance premiums applied for the year 2005. We considered the following exchange rate from this year: 1GHC = 0.4US$.

[7] These information are available upon request.

[8] If we consider both information we would have a considerable smaller sample that includes 7619 individuals in 3496 households, which would make our findings less representative.

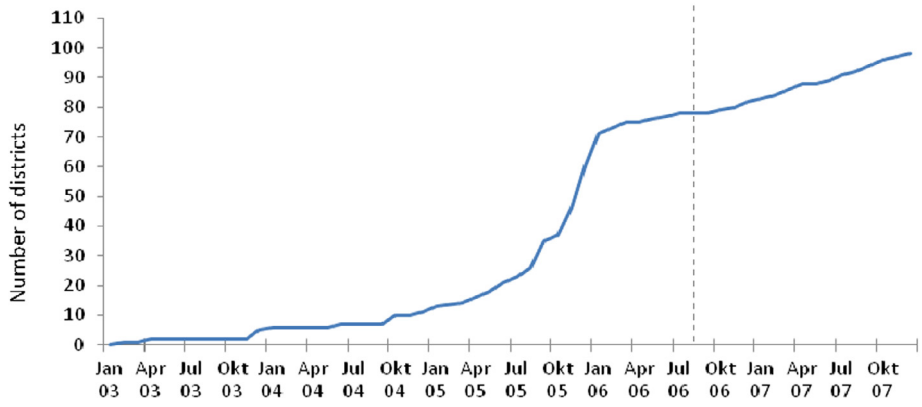

Fig. 1. Availability of the NHIS on the district level. *Source:* Collected data on the exact implementation dates.

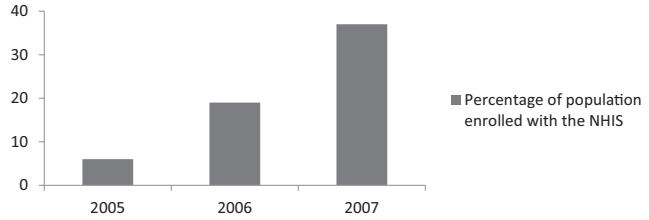

Fig. 2. NHIS enrollment rates. *Source:* National Health Insurance Scheme annual report. Accra, Ghana: National Health Insurance Authority; 2010.

because they may have a motive in 'forgetting' the favors as they probably have a moral obligation to reciprocate. Also, those who made transfers might overstate their contribution and do not report that they also have benefitted from a reciprocal transfer network.

Thus, our sample includes 11,731 individuals living in 5778 households that gave information on made transfers, while our sample for received transfers consists of 11,331 individuals from 5499 households.

3.2. Identification strategy

In order to investigate the relationship between informal transfer networks and formal health insurance, we rely on a comparison of districts where the NHIS is implemented with districts where it is not. We collected data on the exact implementation dates of the NHIS, i.e. on when health insurance coverage became available at the district level. As most districts implemented the NHIS at the end of 2005 (see Fig. 1) and district's sub-districts were surveyed at different points in time in the 5th wave of the GLSS, we are able to use the variation in interview dates to compare individuals that have been interviewed before and after the introduction of the insurance scheme of the same districts.[9] Thus, by also considering the 1998/1999 wave of the GLSS, we are able to observe individuals from the same districts at three points in time: before the NHIS implementation in 1998/1999 (round 1), before the NHIS implementation in 2005/2006 (round 2) and after the implementation of the NHIS in 2005/2006 (round 3).

To determine the causal impact requires comparing the individual transfer behavior after the district having implemented the NHIS to the counterfactual situation of the same individual had the district not implemented the NHIS, which is a clearly impossible task. We instead approximate this counterfactual situation by relying on the inclusion of a control group that fulfils certain requirements to make the underlying identification assumption hold. Specifically, the control group should mimic the behavior of individuals that live in NHIS districts in the absence of the NHIS. Thus, the principal identification assumption of this comparison is that individuals living in NHIS districts would made/receive transfers with the same probability of individuals living in non NHIS districts under the hypothetical circumstance that the NHIS districts have no NHIS. This assumption is easily violated. If, for example, wealthy districts are more able to implement the NHIS and also receive less informal transfers, one may falsely attribute the lower level of received transfers to the presence of the NHIS rather than to the characteristics of the district.

In order to deal with this selection bias in identifying the impact of the formal health insurance scheme on informal transfer behavior, we begin with the following regression model:

$$y_{idt} = \beta_0 + \beta_1 NHIS_{idt} + \beta_2' X + \epsilon_{idt} \quad (1)$$

The dependent variable y_{idt} indicates if respondent i that lives in district d and was surveyed in month t, makes (receives) transfers. This variable is regressed on the binary treatment variable$NHIS_{idt}$, which takes the value 1 if the respondent was surveyed after the district implemented the NHIS and 0 otherwise. β_0 is a constant, while X is a matrix containing individual, household, district and sub-district specific variables.[10] Our coefficient of interest is β_1, which represents an intention-to-treat effect (ITT) i.e. the effect of an offer to participate in the NHIS on the individual's transfer behavior.

Whether we can interpret this effect as causal depends critically on our ability to control for the range of confounding factors that determine transfer behavior and that are correlated with the presence of the NHIS. We consider a range of variables that are typically used to control for socioeconomic characteristics of the household such as the level of education, working status, age and sex (see Table A1 in the Appendix). In addition, we include household expenditures, as an important control variable for the financial potential of a household (Deaton, 1997).[11] We also include a dummy variable that indicates whether the respondent lives in an urban sub-district. Furthermore, we condition on variables that possibly determine the degree of informal risk sharing. These are household size, marital status, owning a savings account and migration status.

[9] The districts in this cross-sectional household surveys contain sub-districts that were interviewed in different months during a 12 month survey period. In the 2005/2006 wave of the GLSS every district consists on average of four sub-districts.

[10] The description of the variables is presented in the next section.

[11] Expenditures are corrected with a region-specific consumer price index and an equivalence scale, which reflects age- or sex-specific relative consumption needs (GSS, 2008).

However, we still cannot exclude the possibility that some variables are not observable, in which case the estimate β_1 will be prone to a selection bias and a causal interpretation unwarranted. The implementation of the NHIS might be driven by time-invariant district characteristics that are also correlated with our dependent variables. As we observe the same districts at three points in time, we overcome this selection problem and exploit the panel dimension of our dataset and augment Eq. (1) with a time-invariant and district-specific fixed effect and common time effects:

$$y_{idt} = \beta_0 + \beta_1 NHIS_{idt} + \beta_2' X + \mu_d + \delta_t + \epsilon_{idt} \quad (2)$$

The term μ_d represents district-specific characteristics that affect the outcome variables, but do not change over time, while δ_t represents interview month fixed effects that control for seasonality of the outcome variables and other changes during the survey period.

The parameter β_1 has a causal interpretation if, given our set of covariates, no other differences between the treatment and control group exist that are partially correlated with our outcome variables. This will be violated if, for example, unobservable changes in districts's transfer norms might affect only individuals living in districts without NHIS. In order to check if this is the case in our context, we present the results of placebo regressions. Placebo regressions assume counterfactually that the NHIS implementation took place in a different period of time. Should the implementation of the scheme change transfer behavior between the first two points in time of our analysis i.e. in 1998/1999 (round 1) and before the NHIS implementation in 2005/2006 (round 2), our identification assumption would be seriously challenged. As we did not find statistical significant differences between the districts with and without NHIS over time before the NHIS was implemented, we conclude that this not the case (see Table 2).

Furthermore, in order to check whether districts with and without the NHIS were fundamentally different in levels of our outcome variables before the implementation of the NHIS, we provide a balance table of our dependent variables using the fourth wave of the GLSS (1998/1999).[12] The results indicate that both groups are balanced across all outcome variables before the NHIS implementation (see Table 1).

With regards to our specific setting, using the variation of NHIS implementation dates across districts and the variation of interview dates within districts, the date of the interview might be driven by heterogeneity between sub-districts that also influences the potential outcomes of our analysis. If, for example, the sub-districts were not randomly surveyed over time and the survey team interviewed urban sub-districts first, this would bias our estimates of the NHIS implementation. In order to scrutinize the extent to which observed changes of the NHIS implementation is triggered by structural heterogeneity of sub-districts, we conduct several estimates as robustness checks. We conduct regressions using time invariant and pre-determined characteristics of the sub-districts and their inhabitants such as education, gender and an indicator if the respondent is living in an urban or rural sub-district as dependent variables. The results show that the implementation of the NHIS has no effect on these time-invariant and pre-determined characteristics (see Tables A2 and A3 of the Appendix).

Altogether, we conclude that our findings are due to the implementation of the NHIS and are not driven by a systematic relationship between district characteristics, interview dates and the outcome variables.

[12] This survey was conducted in the same manner over a 12 month period between 1998 and 1999 and contains the same number of districts as the GLSS from 2005/2006.

4. Results and robustness checks

Before we turn to the empirical results, Table 1 displays a balance table that shows the means of our dependent variables from the 4th wave of the GLSS in order to check whether districts with and without the NHIS were fundamentally different before the implementation of the NHIS. As can be seen from the p-values, two-sided tests of equality of the values for the two compared groups do not reveal statistically significant differences. This indicates that both groups are balanced across all outcome variables before the NHIS implementation.

Additionally, we present the results of placebo regressions. We assess whether there are any statistical significant differences between the districts with and without NHIS over time before the implementation of the NHIS. For our analysis we use the first two rounds of the GLSS, from 1998/1999 and before the NHIS implementation in 2005/2006. We adapt the NHIS variable for that time and run a regression according to Eq. (2). The results show that there are no significant differences over time in the probability of making or receiving transfers between districts that will implement the NHIS and those that will not (see Table 2). In addition, no significant differences can be found for monetary values of made and received transfers and health outcomes, which suggest that our identification assumption is likely to hold in our context.

In Table 3 we provide estimates of the NHIS implementation on transfer outcomes based on Eq. (2) and considering the three rounds of our data (see Table A4 for detailed results). The first two columns of Table 3 contain the estimation results from the linear probability model using made and received transfers as the dependent variable.[13] We find negative coefficients of the NHIS dummy. The implementation of the NHIS decreases the probability of transferring and receiving money to other households by 12 and 9 percentage points. However, the coefficient for received transfers lacks statistical significance at standard levels. Our strategy to estimate two different equations disregards that participation in a sharing network is actually a two-sided problem. As making and receiving transfers depend on each other to some extent, we therefore also test whether coefficients are jointly different from zero. The two-sided-test of joint significance rejects the zero hypothesis at the 1%-level.

In a second step, we examine the extent to which the amount of made or received transfers is affected by the implementation of the NHIS. Therefore, we estimate a regression model, with either the actual amount of made or received transfers as the dependent variable. The implementation of the NHIS leads to a crowding out of made transfers by 29 GHC, which is equivalent, to a relative reduction of 40% and to 9% of average household expenditures. The amount of received transfers decreases by 10 GHC (relative reduction of 18% and of 3% of average household expenditures), but is not statistically significant different from zero. Both coefficients are jointly significant different from zero. Conditional on transfers being made or received, the average amount is reduced by 56 GHC (relative reduction of 20%) for made transfers. The coefficient of received transfers indicates a reduction of 28 GHC (relatively: 8%) but lacks statistical significance These substantial relative reductions are in line with the information that 58 percent of the respondents indicate 'health' as one of the first two purposes of

[13] In this setup our dependent variable y_i is a dummy variable which takes the value 1 if the respondent transfers money or goods to non-household members and 0 if no transfers take place. In addition, we employ the same model to examine whether someone receives transfers. The binary nature of the dependent variable would conventionally suggest the estimation of a probit or logit model. Binary choice models, however, can be problematic when applied using the least squares dummy variable approach because they suffer from the incidental parameters problem and a substantial loss of observations.

Table 1
Difference in means before the implementation of the NHIS.

	Total mean	NHIS mean	No NHIS mean	Difference in means	p-value
Made Transfers (1/0)	0.26	0.26	0.29	−0.03	.14
Amount of made transfers	71.76	74.04	68.15	5.89	.21
N	5750	5145	605		
Received transfers (1/0)	0.15	0.16	0.14	−0.02	.15
Amount of received transfers	56.07	58.39	52.25	6.14	.24
N	6004	5471	533		
Sickness over last 2 weeks (1/0)	0.20	0.20	0.19	−0.01	.49
Number of sick days	1.09	1.07	1.25	−0.18	.18
Out-of-pocket expenditures	29.84	29.45	31.73	−2.28	.19
N	5150	4529	558		

Note: For our calculation we use the GLSS (1998/1999).

Table 2
Placebo effects of the NHIS implementation.

Variables	Made transfers (1/0) Coeff.	Received transfers (1/0) Coeff.	Amount made transfers (GHC) Coeff.	Amount received transfers (GHC) Coeff.	Sickness over last 2 weeks (1/0) Coeff.	Number of sick days Coeff.	OOP expend. (GHC) Coeff.
NHIS	−0.06	−0.05	−8.25	−8.68	−0.06	−0.11	9.75
	(0.14)	(0.16)	(30.38)	(23.80)	(0.06)	(0.42)	(7.75)
N	7758	7995	7758	7995	7024	7024	7024
Adj. R-sq	0.11	0.09	0.08	0.06	0.03	0.05	0.02

For our analysis we use the first two rounds of our data from 1998/1999 and before the NHIS implementation in 2005/2006. We consider district and month fixed effects. Standard errors (in parenthesis) are clustered at the district level. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Table 3
Effect of the NHIS implementation on informal transfers.

Variables	Made transfers (1/0) Coeff.	Received transfers (1/0) Coeff.	Amount made transfers (GHC) Coeff.	Amount received transfers (GHC) Coeff.	Amount made transfers >0 (GHC) Coeff.	Amount received transfers >0 (GHC) Coeff.
NHIS	−0.12*	−0.09	−29.19**	−9.80	−56.16**	−27.95
	(0.07)	(0.07)	(14.88)	(15.68)	(24.96)	(31.61)
N	11,731	11,331	11,731	11,331	4277	2988
Adj. R-sq	0.20	0.16	0.11	0.06	0.14	0.12

We consider district and month fixed effects. Following control variables are included: household size, level of education, household expenditures, working status, age, sex, marital status, owning a savings account, migration status and living in a urban area. Standard errors (in parenthesis) are clustered at the district level. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

making and receiving regular transfers. Unfortunately, we cannot test whether transfers for health purposes are mainly affected by the NHIS implementation using both waves of the GLSS, as only the 5th wave of the GLSS contains information on transfer purposes.

According to our theoretical framework we would expect that the amount of made and received transfers will be similarly affected by the NHIS implementation. We argue that there are three possible explanations for our diverging empirical finding. Firstly, an economic explanation could be asymmetric information between the network partners. Individuals that are already covered by the insurance may still receive transfers from districts where the NHIS is not yet available. Unfortunately, we cannot test this hypothesis, as we do not observe in which district donor and recipient of the same network are living, but a growing body of empirical literature has shown that information asymmetries play a crucial role in remittance decisions (Ambler, 2015; Ashraf, 2009; Jakiela & Ozier, 2012). A second explanation for our finding is that self-reported transfer data typically display a high rate of discrepancy in survey responses. These discrepancies are mostly due to those who receive transfers because they may have a motive in 'forgetting' the favors as they probably have a moral obligation to reciprocate. Also those who made transfers might overstate the amount of transfers in order show their commitment to the reciprocal transfer network (Comola & Fafchamps, 2017). These considerations are in line with our data as we find a much smaller incidence and amount of received transfers compared to made transfers before the implementation of the NHIS (see Table 1). Thus, such systematic misreporting may also explain the differences between the estimates. A third explanation for our finding might be that our analysis includes only those age groups (age 18–69) that are more likely to make transfers and less likely to receive transfers. We check if this is the case and extended our sample by including all children less than 18 years and all individuals aged above 70 years. The results for the extended sample remain similar compared to the original sample.

In order to analyze the effectiveness of the NHIS, we empirically assess whether the formal health insurance scheme affects health-related outcomes (see Table 4 and Table A5). We find negative effects of the NHIS implementation for all outcomes. The availability of the NHIS reduces the probability of being sick over the last two weeks and reduces the number of sick days by a rate of 0.28, but coefficients are not statistically significant. Furthermore, out-of-

Table 4
Effect of the NHIS implementation on recent health status, number of sick days and out-of-pocket expenditures.

Variables	Sickness over last 2 weeks (1/0) Coeff.	Number of sick days Coeff.	Out-of-pocket expenditures (GHC) Coeff.	Out-of-pocket expenditures >0 (GHC) Coeff.
NHIS	−0.04	−0.28	−12.34*	−33.57**
	(0.03)	(0.19)	(7.02)	(16.95)
N	10,497	10,497	10,497	3371
Adj. R-sq	0.05	0.04	0.03	0.09

We consider district and month fixed effects. Following control variables are included: household size, level of education, household expenditures, working status, age, sex, marital status, owning a savings account, migration status and living in a urban area. Standard errors (in parenthesis) are clustered at the district level. *$p < .10$, **$p < .05$, ***$p < .01$.

pocket expenditures for health purposes decrease on average by 12 GHC, which corresponds to a relative reduction of 41 percent. Conditional on expenditures being made, we find a reduction of out-of-pocket expenditures by 33 GHC (relative reduction of 48%).[14] As it was the main goal of the NHIS to make healthcare affordable to all by removing out-of-pocket payment at the point of service, this explains the substantial reductions in out-of-pocket expenditures of the households. Thus, our results suggest that the insurance implementation is effective with regards to the reduction of out-of-pocket expenditures and has a positive impact on the financial protection of households.

5. Conclusion

In this paper we provided empirical evidence that a formal health insurance scheme crowds out regular informal transfers in Ghana. We analyze data from the fourth and fifth Ghanaian Living Standard Surveys and are able to observe individuals from the same districts at three points in time: before the NHIS implementation in 1998/1999 and in 2005/2006 and after the implementation of the NHIS in 2005/2006. Hence, in our empirical approach we exploit the panel dimension of the data by estimating a district fixed effects model that control for time-invariant unobserved characteristics of the districts.

We evaluate whether the availability of a country-wide formal health insurance affects informal transfer networks and also investigate the impact of the NHIS on health-related outcomes. Our findings suggest that there is a crowding out effect, since the introduction of the formal health insurance scheme results in a lower probability of making transfers. Negative coefficients for received transfers lack statistical significance at standard levels. Accordingly, the amount of remittances also decreases to a significant extent. Turning to the analysis of health-related outcomes, we find that the NHIS reduces out-of-pocket expenditures of the respondents. As the NHIS covers all basic outpatient and inpatient services, we interpret our results as an indication that not only ill individuals benefit financially from the NHIS, but also donors are financially relieved after the implementation of the NHIS. Interestingly, the reduction of out-of-pocket payments is smaller compared to the reduction of the amount of transfers, which is in line with higher formal health care utilization rates among NHIS members (Fenny, Asante, Enemark, & Hansen, 2015) and recent experimental evidence showing that transfers can be reduced by the mere existence of formal insurance, as network partners expect lower benefits from informal sharing networks in the future (Cecchi et al., 2016; Lenel & Steiner, 2017). This result is particularly concerning if transfers were lowered to people who are too poor to pay for insurance premiums, which calls for complementing insurance with social safety nets targeted at the poor.

From a policy perspective it would be of interest to investigate whether the observed changes in transfer behavior also translate into higher investments or savings in the long run. In particular, to reveal the extent to which the crowding out of informal transfers is used for investments or consumption purposes by also considering direct costs (insurance premiums) and indirect costs (2.5% addition to the value added tax) of the NHIS. As the sixth round of the GLSS is available, a promising avenue for future research would therefore be to examine whether the implementation of the NHIS leads on average to a gain or loss for covered individuals in the long run.

Conflict of interest

None.

Appendix

Table A1
Descriptive statistics.

Variable	Sample made transfers Mean	Sample received transfers Mean
Made Transfers (1/0)	0.36	
Amount of made transfers	73.91	
Received Transfers		0.26
Amount of received transfers		63.01
Household size	5.22	5.20
HH expenditures Quintile 2 (0/1)	0.19	0.19
HH expenditures Quintile 3 (0/1)	0.19	0.19
HH expenditures Quintile 4 (0/1)	0.20	0.20
HH expenditures Quintile 5 (0/1)	0.22	0.21
HH saving account (0/1)	0.26	0.26
Migrant (0/1)	0.19	0.19
Informal employed (0/1)	0.17	0.17
Informal self employment (0/1)	0.80	0.80
Primary School (0/1)	0.17	0.17
Junior High School (0/1)	0.24	0.25
Secondary High School (0/1)	0.17	0.15
Technical School (0/1)	0.04	0.03
University (0/1)	0.02	0.01
Female (0/1)	0.55	0.55
Age	37.51	37.48
Married (0/1)	0.55	0.56
Urban (0/1)	0.32	0.30
Number of observation	11,731	11,331

[14] Our findings are in line with Powell-Jackson, Hanson, Whitty, and Ansah (2014) who examine the impact of removing user fees for healthcare using data from a randomized control trial in Ghana. The authors also find a reduction of out-of-pocket expenditures and no statistically significant effect on health.

Table A2
Effect of the NHIS implementation on time-invariant characteristics as dependent variables – sample of made transfers.

	Urban	Female	Married	Primary school	J. High School	Sec. High School	Technical School	University
NHIS	−0.039	0.019	−0.184	−0.027	0.037	−0.024	−0.017	−0.0176
	(0.122)	(0.038)	(0.177)	(0.033)	(0.029)	(0.035)	(0.022)	(0.019)
N	11,731	11,731	11,731	11,731	11,731	11,731	11,731	11,731
Adj. R-sq	0.112	0.002	0.002	0.002	0.002	0.006	0.013	0.004

District and month fixed effects are included. Standard errors (in parenthesis) are clustered at the district level. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Table A3
Effect of the NHIS implementation on time-invariant characteristics as dependent variables – sample of received transfers.

	Urban	Female	Married	Primary school	J. High School	Sec. High School	Technical School	University
NHIS	−0.139	0.036	−0.027	0.006	0.025	−0.021	0.011	−0.005
	(0.118)	(0.035)	(0.056)	(0.034)	(0.041)	(0.051)	(0.020)	(0.007)
N	11,331	11,331	11,331	11,331	11,331	11,331	11,331	11,331
Adj. R-sq	0.06	0.001	0.001	0.002	0.001	0.006	0.011	0.001

District and month fixed effects are included. Standard errors (in parenthesis) are clustered at the district level. $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Table A4
Effect of the NHIS implementation on informal transfers.

	Made transfers (1/0)	Received transfers(1/0)	Amount made transfers (GHC)	Amount received transfers (GHC)	Amount made transfers >0 (GHC)	Amount received transfers >0 (GHC)
NHIS	−0.119*	−0.0854	−29.19**	−9.799	−56.16**	−27.96
	(0.0713)	(0.0785)	(14.88)	(15.69)	(24.96)	(31.61)
Household size	0.0187***	0.00199	5.540***	2.013*	5.459**	10.66***
	(0.00382)	(0.00285)	(1.129)	(1.150)	(2.090)	(3.729)
HH saving account	0.155***	0.0299*	42.54***	7.610	14.53	6.833
	(0.0202)	(0.0155)	(6.203)	(6.642)	(11.38)	(18.09)
Migrant	−0.00992	−0.0101	−0.664	1.415	1.390	7.103
	(0.0151)	(0.0152)	(5.717)	(6.788)	(14.67)	(13.30)
Informal employed	0.0897*	−0.330***	14.52	−144.2***	−5.741	−10.98
	(0.0457)	(0.0465)	(13.34)	(28.25)	(36.17)	(57.88)
Self-employment	0.180***	−0.294***	42.07***	−138.6***	46.75*	−62.24*
	(0.0289)	(0.0461)	(8.257)	(29.26)	(26.82)	(33.17)
HH expenditures Q2	0.0799***	−0.0156	21.55***	−2.299	44.54**	9.919
	(0.0231)	(0.0252)	(6.438)	(9.160)	(17.00)	(25.40)
HH expenditures Q3	0.119***	−0.0111	36.63***	2.612	71.78***	27.86
	(0.0245)	(0.0268)	(7.836)	(9.605)	(18.22)	(27.48)
HH expenditures Q4	0.160***	0.00107	52.39***	3.257	89.81***	35.48
	(0.0290)	(0.0275)	(9.069)	(10.49)	(20.36)	(30.09)
HH expenditures Q5	0.253***	0.0256	97.18***	35.23**	145.0***	141.4***
	(0.0317)	(0.0307)	(9.239)	(13.41)	(21.26)	(33.97)
Primary School	0.0437**	0.0185	12.97***	7.714	4.089	6.098
	(0.0169)	(0.0136)	(4.864)	(5.074)	(9.095)	(12.63)
Junior High School	0.0344**	0.0443***	10.81**	19.40***	4.073	30.62*
	(0.0158)	(0.0136)	(5.119)	(5.472)	(9.707)	(15.88)
Secondary High School	0.0364**	0.0170	24.15***	31.73***	33.37***	73.20***
	(0.0168)	(0.0191)	(5.591)	(7.789)	(10.58)	(18.74)
Technical School	0.0814***	0.0430	61.36***	50.79***	63.53***	84.39***
	(0.0274)	(0.0285)	(12.53)	(13.55)	(18.18)	(29.03)
University	0.0423	0.0385	70.58***	86.84***	90.50***	237.9***
	(0.0331)	(0.0357)	(19.02)	(27.90)	(24.12)	(82.88)
Female	−0.0331***	0.0641***	−6.609**	34.25***	1.381	52.55***
	(0.00750)	(0.00881)	(2.871)	(4.317)	(4.509)	(9.794)
Married	0.0135	−0.0709***	1.285	−13.18***	−4.039	5.656
	(0.0115)	(0.0115)	(4.745)	(4.717)	(10.59)	(11.76)
Age	0.00804***	−0.00952***	2.200***	−4.532***	1.617	−5.126**
	(0.00172)	(0.00195)	(0.601)	(0.862)	(1.506)	(1.986)
Age squared	−0.000098***	0.000152***	−0.0264***	0.0639***	−0.0205	0.0656***
	(0.0000197)	(0.0000235)	(0.00676)	(0.0105)	(0.0171)	(0.0224)
Urban	−0.0860***	0.0169	−12.21	13.99	19.75	28.28
	(0.0237)	(0.0248)	(7.689)	(9.973)	(11.95)	(28.94)
N	11,731	11,331	11,731	11,331	4277	2988
Adj. R-sq	0.199	0.155	0.112	0.058	0.142	0.121

Table A5
Effect of the NHIS implementation on health related outcomes.

	Sickness over last 2 weeks (1/0)	Number of sick days	Out-of-pocket expenditures (GHC)	Out-of-pocket expenditures >0 (GHC)
NHIS	−0.0425	−0.285	−12.34*	−33.57**
	(0.0336)	(0.191)	(7.021)	(16.95)
Household size	−0.00565***	−0.0322***	−0.332	1.545
	(0.00163)	(0.0100)	(0.393)	(1.416)
HH saving account	−0.00973	−0.0112	−2.364	−2.977
	(0.00774)	(0.0604)	(2.690)	(8.271)
Migrant	−0.00121	0.0302	0.143	−6.500
	(0.0118)	(0.0747)	(2.003)	(6.787)
Informal employed	−0.108***	−1.467***	−39.703**	−70.103*
	(0.0299)	(0.261)	(17.707)	(39.482)
Self-employment	−0.0780***	−1.190***	−37.770**	−85.267**
	(0.0280)	(0.252)	(17.405)	(36.211)
HH expenditures Q2	0.0308**	0.203**	4.795*	−11.411
	(0.0128)	(0.0861)	(2.589)	(9.730)
HH expenditures Q3	0.0394***	0.168*	6.748**	14.11*
	(0.0143)	(0.101)	(2.827)	(7.903)
HH expenditures Q4	0.0528***	0.234**	6.503**	18.07**
	(0.0145)	(0.108)	(2.855)	(9.006)
HH expenditures Q5	0.0867***	0.368***	18.68***	38.20***
	(0.0175)	(0.123)	(3.436)	(10.53)
Primary School	0.0238**	0.0847	3.405	0.932
	(0.0115)	(0.0919)	(2.498)	(6.774)
Junior High School	−0.0131	−0.112	2.741	12.76*
	(0.0126)	(0.0859)	(2.614)	(6.788)
Secondary High School	−0.0265**	−0.216**	7.751	28.56*
	(0.0120)	(0.0990)	(5.183)	(15.56)
Technical School	−0.0678***	−0.592***	1.904	25.79**
	(0.0167)	(0.117)	(4.631)	(12.76)
University	−0.0660***	−0.437**	38.09**	128.81***
	(0.0240)	(0.193)	(15.06)	(39.80)
Female	0.0348***	0.159**	4.371*	11.49*
	(0.00797)	(0.0610)	(2.203)	(6.678)
Married	−0.0238**	−0.125*	2.225	8.469
	(0.00978)	(0.0685)	(2.373)	(6.480)
Age	0.00574***	0.0174	0.555	−1.534
	(0.00195)	(0.0129)	(0.524)	(1.427)
Age squared	−0.0000307	0.000113	−0.00153	0.0219
	(0.0000236)	(0.000165)	(0.00681)	(0.0173)
Urban	−0.0144	−0.0668	5.520*	23.69**
	(0.0141)	(0.0940)	(2.951)	(10.05)
N	10,497	10,497	10,497	3371
Adj. R-sq	0.047	0.044	0.029	0.090

Acknowledgements

The authors would like to thank Martin Karlsson, Christoph M. Schmidt, Martin Fischer, Gunther Bensch, Stefan Pichler, Hannes Öhler and Colin Vance and participants of the Health Economics Research Seminar at the University of Duisburg-Essen and the University of Heidelberg for helpful comments. We also gratefully acknowledge the comments and suggestions of participants of the 2014 CSAE conference in Oxford and the 2014 conference on Development Economics and Policy in Passau (Germany).

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