



# Health insurance, a friend in need? Impacts of formal insurance and crowding out of informal insurance

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## ABSTRACT

Health insurance can improve health-seeking behaviors and protect consumption from health shocks but may also crowd out informal insurance. This paper therefore examines whether impacts of health insurance depend on households' access to informal insurance, as proxied for by mobile money usage. Based on high-frequency financial diaries data collected in rural Kenya, we find that households with weaker access to informal insurance cope with uninsured health shocks by lowering subsequent non-health expenditures by approximately 25 percent. These same households are able to smooth consumption when health shocks are insured, due to lower out-of-pocket health expenditures. In contrast, households with access to informal insurance are able to smooth consumption even in the absence of formal health insurance. For this latter group, health insurance increases healthcare utilization at formal clinics and does not crowd out gifts and remittances during weeks with health shocks. These findings provide guidance for insurance schemes aiming to target the most vulnerable populations.

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## 1. Introduction

In low- and middle-income countries, households pay a large share of health expenditures out of pocket. To cope with these expenditures, households rely on self-insurance through precautionary savings (Rosenzweig & Wolpin, 1993), adjustments in labor supply (Kochar, 1995), borrowing and informal credit (Khan, Bedi, & Sparrow, 2015; Udry, 1994), and informal transfers in the form of gifts and remittances (De Weerd & Dercon, 2006; Fafchamps, 1992; Fafchamps & Lund, 2003). However, these coping strategies provide incomplete insurance; several studies have found that households are unable to fully smooth consumption when household members fall ill (Gertler & Gruber, 2002; Heltberg & Lund, 2009; Morduch, 1999; Wagstaff, 2007), and that they underutilize both preventive and curative healthcare (Dupas, 2011).<sup>1</sup>

In recent years, many countries have started introducing health insurance for the poor. Health insurance allows households to pre-pay for healthcare, thereby reducing the share of catastrophic

health expenditures that households need to pay out of pocket. As such, health insurance potentially improves both consumption smoothing and health-seeking behavior (Azam, 2018). However, if informal coping strategies and formal health insurance play similar roles in the presence of health shocks, health insurance may replace informal insurance without generating additional impacts or may even result in increased medical spending (Wagstaff, 2007). The anticipation of such substitution effects could explain why many health insurance pilots suffer from relatively low demand (Acharya et al., 2012).

This study therefore tests whether health insurance impacts depend on households' access to informal insurance mechanisms. To do so, it uses detailed, high-frequency financial diaries data that provide weekly measures of illnesses, healthcare utilization, out-of-pocket health expenditures, informal coping strategies and non-health expenditures. These data were collected over the period of a full year (2012–2013) among a sample of rural households in western Kenya. For nearly half of the households, enrollment status varied over time. We will use this within-household variation in insurance status in the identification of health insurance impacts.

We test whether the impact of formal health insurance differs by mobile money usage. We conjecture that usage of mobile

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<sup>1</sup> Informal risk-sharing institutions upon which the poor rely heavily to cope with illnesses may fail, for instance, during periods of natural disasters (Takasaki, 2017).

money can serve as a proxy for access to informal insurance. Study participants using mobile money received more money from friends and family and withdrew more savings than non-users of mobile money. User households' income from informal transfers and buffer stock sales increased during periods of uninsured health shocks, which we do not observe for non-users of mobile money, suggesting that mobile money users have better access to informal strategies to cope with risk. We cannot attribute this improved ability to cope with risk to the mobile money technology itself. Instead, we hypothesize that households with greater access to informal coping mechanisms select into using mobile money.

We analyze the effects of health insurance using a household fixed-effects model. Building on time variation in insurance status within households, we test whether the same household copes differently with illness or injury depending on whether the household has insurance coverage at the time of the shock. We find that health insurance has two distinct effects. First, among non-users of mobile money, who appear to have weaker access to informal insurance, health shocks decrease food expenditures in subsequent weeks, but only during uninsured periods. Insurance coverage reduces out-of-pocket health expenditures, providing an explanation for why insured households are better able to smooth consumption. Second, among mobile money users, who withdraw more savings and receive more informal transfers during weeks with uninsured health shocks, health shocks do not affect food expenditures. Health insurance, however, does not crowd out informal insurance, and it increases the utilization of clinics while also lowering out-of-pocket expenditures in these clinics. Thus, by shifting patients from the informal health sector to formal clinics, insurance complements the informal insurance mechanisms that help mobile money users cope with health shocks.

This paper relates to the existing literature in several ways. First, it adds to the literature on health insurance impacts in low- and middle-income countries. Past research shows that health insurance can improve health-seeking behavior, provide financial protection from health shocks by reducing catastrophic health expenditures, and in some cases improve non-medical consumption (Fink, Robyn, Sié, & Sauerborn, 2013; Hamid, Roberts, & Mosley, 2011; Miller, Pinto, & Vera-Hernández, 2013; Wagstaff & Pradhan, 2005), although other studies do not find impacts (Acharya et al., 2012; Dhanaraj, 2016; Karan, Yip, & Mahal, 2017). These studies mainly rely on low-frequency data, collected over a period of at least one to two years. We use high-frequency data instead, which can help improve the power to detect impacts, especially for dependent variables with low autocorrelation (McKenzie, 2012). Further, given that longer recall periods are associated with underreporting of morbidity, doctor visits, and sickness absenteeism (Das, Hammer, & Sánchez-Paramo, 2012), shorter recall periods (in our case of only a week) can improve impact estimates. Our data also include mild illnesses and injuries that could easily be forgotten in a survey three months later, but that account for more than one-third of all health shocks.

Second, the paper relates to the literature on linkages between formal insurance and informal insurance. To date, this literature has mainly focused on how informal insurance can crowd out the demand for formal insurance. Using observational data, Mobarak and Rosenzweig (1007) showed that informal risk-sharing in caste groups reduces demand for formal weather insurance. Informal transfers may discourage individuals from purchasing optimal levels of formal health insurance coverage (Jowett, 2003), in part because they can rely on contributions from insured peers when they fall ill (Janssens & Kramer, 2016). Studies on whether health insurance crowds out informal insurance are rare. However, social security, pensions, and food aid have been shown to crowd out private transfers, thus reducing program impacts (Cox & Jimenez, 1992; Dercon & Krishnan, 2003; Jensen, 2004),

and Strupat and Klohn (2018) find crowding out of informal transfers related to the implementation of a national health insurance scheme in Ghana. We do not replicate this finding, neither for informal transfers nor for other informal coping mechanisms.

Third, the paper links to the literature on mobile money. Mobile money can improve welfare in general, and health financing more specifically, by reducing the cost of sending and receiving transfers (Jack & Suri, 2014; Munyegera & Matsumoto, 2016) and by allowing recipients to spend transfers differently than people who receive transfers manually (Aker, Boumnijel, McClelland, & Tierney, 2016). Unlike Jack and Suri (2014), we cannot attribute improved risk-coping to the existence of mobile money technology. Instead, we test whether health insurance has different impacts depending on whether households use mobile money, hypothesizing that households with better access to informal insurance select into using mobile money. Although we indeed find impact heterogeneity, our findings suggest that insurance can have positive impacts even for households with a greater ability to finance their medical bills.

The remainder of this paper is structured as follows. The next section describes the intervention and identification strategy. Section 3 presents more details on data collection and the main variables of interest and validates mobile money usage as a proxy for access to informal insurance. The econometric results are presented in Section 4. The final section discusses the implications of these findings for the design and targeting of health insurance and mobile health financing products.

## 2. Methods

### 2.1. Context

The study uses data collected among a sample of dairy farmers from Nandi County, a predominantly rural area in western Kenya characterized by poor access to affordable, quality healthcare.<sup>2</sup> At the time of the study, Kenya's national health insurance scheme, the National Hospital Insurance Fund (NHIF), covered inpatient care in public hospitals but not health expenditures in private facilities or expenditures for outpatient care. Moreover, enrollment in NHIF among informal sector workers was very low. Hence, despite the existence of the NHIF, the average household (often uninsured) still paid 38.7 percent of total health expenditures out of pocket (Kenya National Health Accounts, 2012/2013).

In the absence of formal health insurance coverage, households may have developed alternative risk-coping strategies, including the use of informal credit, transfers, and savings; in our context, savings include both cash savings and in-kind buffer stock savings in the form of small livestock and maize kept in storage. In addition, urban-rural remittances appear to play an important role in health financing in eastern Africa. De and Hirvonen (2016), for instance, found a reduction in Tanzanian migrants' consumption in years after their extended family at home experienced negative shocks such as a serious illness, suggesting that these migrants were sending money home to help their family pay medical bills. When households receive informal transfers to cope with health shocks, there is less scope for health insurance to provide financial protection from catastrophic health expenditures and to improve health-seeking behavior.

<sup>2</sup> Nandi County had a population of 752,965 in the 2009 National Population and Housing Census. The area is typical of rural Kenya, with a poverty rate of 47.4 percent, primary school attainment of approximately 67.3 percent, and secondary school attainment of only 10.7 percent, according to the Kenya Integrated Household Budget Survey (KIHBS) 2016/2017. With only 13.6 percent of Nandi County's population living in urban areas, agriculture—including dairy farming—forms the main economic activity in the area.

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