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"Health impacts of a monetary policy shock: Evidence from India's 2016 demonetization"

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Abstract

By looking at the unexpected demonetization of 86 percent of India's currency in 2016, I analyze health impacts of monetary policy. Using individual-level health data from the Demographic and Health Survey and bank data from the Reserve Bank of India, I utilize the geographic variation in shock exposure as a natural experiment. I compare respondents before and after the demonetization with a pooled cross-section difference-in-differences approach. My significant short-run results show increased diastolic blood pressure, alcohol use and problems in accessing healthcare along with a decrease in tobacco use. Thus, the monetary policy measure exacerbated health conditions and features of the healthcare system and influenced health behavior in distinctive directions. Bank accounts and mobile phones were of health relevance in this regard, while their importance did not differ in terms of the degree of demonetization. To substantiate my findings, I build a demonetization model with health and health consumption. It confirms an overall health drop, intensified in more affected regions.

Keywords: Demonetization, India, Monetary policy, Policy implications, Health condition, Health behavior, Health system
JEL Codes: E41, E51, E52, E58, I15, I18, O17

Zusammenfassung

Anhand der unerwarteten Demonetisierung von 86 Prozent der indischen Währung im Jahr 2016 analysiere ich die gesundheitlichen Auswirkungen von Geldpolitiken. Unter Verwendung von Gesundheitsdaten auf individueller Ebene aus dem Demographic and Health Survey und Bankdaten der Reserve Bank of India nutze ich die geografischen Variationen der Schockbelastung als natürliches Experiment. Ich vergleiche die Befragten vor und nach der Demonetarisierung mit einem gepoolten Querschnitts-Differenz-von-Differenzen-Ansatz. Meine signifikanten Kurzzeit-Ergebnisse zeigen einen Anstieg des diastolischen Blutdrucks, des Alkoholkonsums und der Probleme beim Zugang zur Gesundheitsversorgung sowie einen Rückgang des Tabakkonsums. Die geldpolitische Maßnahme verschärfte also den Gesundheitszustand und die Merkmale des Gesundheitswesens und beeinflusste das Gesundheitsverhalten in unterschiedliche Richtungen. Bankkonten und Mobiltelefone waren in diesem Zusammenhang von gesundheitlicher Relevanz, wobei sich ihre Bedeutung nicht nach dem Grad der Demonetarisierung unterschied. Um die Ergebnisse zu untermauern, konstruiere ich ein Demonetarisierungsmodell mit Gesundheit und Gesundheitskonsum. Es bestätigt einen allgemeinen Rückgang der Gesundheit, der sich in stärker betroffenen Regionen noch verstärkt.

Keywords: Demonetisierung, Indien, Geldpolitik, Politikauswirkungen, Gesundheitszustand, Gesundheitsverhalten, Gesundheitswesen

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1 Introduction

”The first wealth is health” writes the philosopher Ralph Waldo Emerson (1860). Health is essential to our society, but is given limited consideration in monetary macroeconomics. This master’s thesis is an empirical work on the impact of monetary policy shocks on health aspects. Combining the 2015/16 Demographic and health survey (DHS) with bank data from the Reserve Bank of India (RBI), I look at India’s 2016 demonetization event. I find evidence for worsened health conditions, adverse effects on health behavior and greater barriers to accessing healthcare. In addition, having a bank account or a mobile phone was relevant for the strength of those effects, although not to a different extent for higher demonetization exposure. To guide the empirical analysis, I develop a demonetization model with health as a function of health consumption. It shows that an unexpected cash crunch reduces health both overall and intensified in more affected regions.

Public health is generally difficult to attribute to monetary policy measures. Consequently, this leads to a limited understanding of fundamental concepts between monetary macroeconomics and health. The lack of comprehensive evidence means that health is not, or very indirectly, used as a decision criterion for monetary policy. However, health effects could amplify or perhaps even reverse welfare effects and contradict classical, purely monetary macroeconomic considerations. By looking at the unique unexpected event of demonetization, I am able to partially close this gap. Theoretically, a demonetization could have both positive and negative effects on health. The propagation mechanisms are the healthcare system, consumption, medical treatment, and mental health. A successful implementation could broaden the tax base, formalize informal healthcare providers and generally boost economic activity. However, the cash shortage could also weaken the economy, leading to income reduction and job losses. As a result, people would choose not to seek medical treatment or postpone it. The inability to pay may additionally cause financial hardship and mental health problems. Due to the prolonged demonetization, the negative effects appear to predominate in cash-dependent India. The high proportion of uninsured, the abysmal standard of Indian health care, and the circumstance that households spend a large portion of their budgets on health have additionally exacerbated the situation (Banerjee et al., 2004).

For example, as there was no cash for food, there were direct declines in nutrition levels (Janardhanan, 2016). Mental stress was widespread and what was formerly taken for granted became a challenge accompanied by distress (Dogra, 2016). Moreover, health seekers with old notes were rejected at private facilities, whereby non-public healthcare providers account for approximately 70 percent of outpatients and 60 percent of inpatients (Nagarajan, 2017; Saha & Yadavar, 2016). Furthermore, the number of postponements and terminations of treatments has increased (Khan, 2016). As old notes were accepted at public health facilities and pharmacies for a period of time, people resorted to public facilities. Those were completely overloaded and for many not even accessible (Mohindra & Mukherjee, 2018). Since it has been demonstrated that Indian health services’ quality has an impact on health, I expect that there was a direct decrease in health as a result of this quality decline (Banerjee et al., 2004). The loss of financial resources additionally increased anxiety and suicide rates. Women’s institutions also reported more cases of domestic violence due to partners’ control over money and the stress associated with it (Mohindra & Mukherjee, 2018). In all belongings, the poor, and those working in the informal sector, were the most affected, as they were more reliant on receiving their earnings in cash.

In this context, I hypothesize for the short-run that, first, India's reduction in currency in circulation did not impact health conditions. Second, it did not influence health behavior. Third, it did not impact health system characteristics. And fourth, wealth, having a bank account, and using a mobile phone did not have an influence on the severity of those effects.

To identify causal impacts of the demonetization, I compare people surveyed before and after the shock with a difference-in-differences (DiD) approach. Interviews were conducted in 19 districts of the states Arunachal Pradesh, Jammu & Kashmir and Jarkhand for 29 days after the demonetization. I make use of the cross-regional variation in exposure as a natural experiment. The strength of the demonetization is proxied with the relative importance of currency chests in a district. Currency chests are private banks facilitating currency distribution. My empirical strategy relies on the exogeneity of the demonetization and the interview dates. I divide health into the three categories of health conditions, health behavior, and health system characteristics, all representing risk factors for potential illnesses. First, health conditions are directly measurable health metrics. Blood pressure and blood glucose are well known, capture many health risks and are among other things influenced by living conditions, diet, and mental health. For better interpretation, I combine systolic and diastolic blood pressure to hypertension. My dataset contains detailed individual information on blood pressure and glucose sampling. Second, health behaviors are actions of individuals that affect their health. Tobacco and alcohol consumption are the most prominent examples and have been proven to have numerous negative effects on health. Third, health system characteristics capture the entire healthcare apparatus of a country. In a poorly functioning health system, and especially for the rural poor, access is often more important than the quality of care. I use a question-based assessment of seven access issues for women, one being money. Furthermore, to make society more resilient in light of health, it is crucial to find determinants that help people cope with these shocks. Wealth, bank accounts, and mobile phones are cited in the literature as aids in tackling the aftermath of the demonetization. Therefore, I test their importance in the regressions, which also include detailed individual controls. Robustness checks are conducted for covariate shocks, occupation, geographic characteristics and nutrition levels if applicable.

My main findings are as follows. In the short-run, a one percent higher exposure to the demonetization increased diastolic blood pressure by 0.065 percent. Moreover, the patterns of substance use change were ambiguous. A one percent higher exposure increased the proportional odds for alcohol frequency levels by 1.587 percent but decreased the odds of tobacco consumption by 1.869 percent. The odds of having problems accessing healthcare also increased by 4.238 percent for a one percent higher exposure. I did not find any significant effects of greater demonetization exposure on hypertension, systolic blood pressure, glucose level and money as the access problem. Summarized in other words, the demonetization had mainly negative health effects, except for the decrease in tobacco consumption. All of these results are robust against month-fixed effects (FE) but not against occupational controls, with the proviso that the latter greatly reduces the sample size. Additionally, blood pressure is not robust to detailed geospatial controls. Compared to wealth, ownership of a bank account or a mobile phone played a role in post-shock health, although it did not play a more important role across exposures.

1.1 Demonetization background

On November 8, 2016, the prime minister of India gave a speech to the nation declaring the 500 and 1000 Indian rupee (INR) notes as illegal tender. The two highest-denominated notes accounted for approximately 86 percent of currency in circulation which corresponds to 10 percent of gross domestic product (GDP). Old banknotes could be deposited with banks, exchanged for new rupee notes or spent on specific public services.[1] It was initially intended to combat black money, detect fake notes, and reduce corruption (Modi, 2016). The process of remonetization, however, took several months. Consequently, there was a strong impact on the local population. In the cash-dependent economy, this was reflected in bank runs, protests, and strikes indicating psychological strain. In the two months of acute disruption, there was almost no cash for basic needs like groceries and water, or medicine and healthcare, which is critical in a poor public healthcare system. As people are forward-looking and try to smooth consumption, strategic cash purchases were made between the announcement and the effective date (Kim et al., 2021).[2] Nevertheless, illiquidity was followed by job losses and the shutdown of businesses. Comparing the two months before and after, there was a three percent drop in labor force participation and a loss of 12 million jobs (Vyas, 2018). All of this was particularly pronounced in rural areas with a lack of banking infrastructure and the informal sector, which greatly relies on cash (Subramaniam, 2020). But as necessity is the mother of invention, people started to adjust to this situation. For example, various forms of digital payments developed rapidly. Particularly noteworthy are mobile phone payment methods. Thanks to the low cost of adaptation for firms and relatively easy accessibility for the population, they could be seen in both large and small stores within a very short time. Moreover, loans from informal sources like shops or moneylenders became usual.

To the extent that unpredictability is credible, the demonetization is one of few truly exogenous monetary policy shocks.[3] The natural experiment provides an opportunity to analyze the effects of an exogenous reduction in the cash supply. This could be a rough estimate for blackouts in digital currencies as well as, in a broader sense, for contractionary monetary policy. Technically, the initial demonetization was a reduction in high-powered money, not narrow money. High-powered (Base or Reserve) money M0 is currency in circulation plus deposits with the RBI. Narrow money M1 is M0 plus demand deposits (RBI, 2007). India's cash crunch at first only converted a large portion of M0 to M1.[4] However, since the deposition of old banknotes needed time, M1 and higher measures of money supply also decreased. M1 recovered in mid-2017, while M0 did not reach October 2016 levels until January 2018. According to Lahiri (2020) the

[1] Demonetization, in the vernacular, sometimes called 'notebandi', replaced the Mahatma Gandhi Series with the Mahatma Gandhi New Series of banknotes. Deposition in banks was possible for 50 days. In the first months, the exchange at bank offices and ATM withdrawals were capped. The last day of exchange was December 31, 2016.

[2] Announcement on November 8, 2016, at 8:15 p.m IST. At midnight, the same day, the demonetization came into effect.

[3] There had been rumors about a demonetization before it happened. Most convincing evidence is the prior circulation of a new 2000 INR bill photo and the statement of a Bharatiya Janata Party (BJP) member who said that wealthy businessmen were informed (FE Online, 2016; Sethi, 2016). The BJP was the ruling party at the time. In both cases, information had been shared only among a small group. The first might have also just been a reference to a new denomination.

[4] See Romer (2000) for a general and Chattopadhyay (2019) for a demonetization discussion on the categories of money supply.

declared objective of seizing black money failed. The 99 percent of old notes returned at the RBI were not taxed and the tax revenue and tax filers did not increase from the demonetization.

The subsequent thesis is structured as follows: Next, I review the relevant literature. In Section 2, I construct a theoretical health-demonetization model. Section 3 provides an overview of the data, gives a summary statistics, and introduces the variables constructed. Section 4 explains my empirical identification strategy. Section 5 shows my empirical results. Finally, Section 6 concludes with a discussion and outlines policy implications.

1.2 Related Literature

I start by looking at relevant papers on health impacts of India's 2016 demonetization. A first descriptive analysis was written by Mohindra and Mukherjee (2018). They highlight the particularly strong impact on the already disadvantaged. For example, there was a massive job layoff for marginalized groups like Dalits (lowest caste affiliation), migrants, and Adivasis (scheduled tribes). They also point to the demonetization event's weakening of women's empowerment. Often, females had to pledge their hidden savings, which under normal circumstances would have given them financial autonomy. Rationing of resources also tended to be a male priority and disadvantaged women. On top of that, they forwent expensive protected sex practices and had survival sex to feed their families. The authors also mention positive and negative impacts on the healthcare system. On the one hand, due to increased transportation difficulties, small states such as Arunachal Pradesh have experienced problems accessing health care. Particularly since many health services are obtained outside the state's borders. Additionally, according to India's National Sample Survey (2014), the 85 percent of rural and 82 percent of urban uninsured had difficulty paying for healthcare out of pocket. On the other hand, there has been a positive trend towards e-pharmacies, which could be a great help for rural areas. Lastly, they mention the conspicuous decline in food consumption due to rising food prices. In regard to demonetization, Mohindra and Mukherjee (2018) explicitly ask for empirical studies on health and nutrition levels. Yalamanchili et al. (2020) perform a question-based assessment of the utilization of private healthcare services in South India. Accordingly, healthcare utilization was unimpaired in one-quarter of the cases, tolerable in half of the cases, and severely impaired in the remaining cases. A third of the 200 subjects postponed their visit because of the cash shortage and only 35 percent were willing to pay by card. Most likely it was because they did not have access to cashless payments. Altogether, low-income subjects were hit the hardest. In an empirical study on eleven private non-profit hospitals, George et al. (2020) find an overall decrease in inpatients, but no change in outpatients and mortality as a result of demonetization. Furthermore, in tertiary hospitals, there was a persistent 25 percentage points increase in cashless transactions. Deliveries and hospital revenues remained unchanged. Measuring the frequency of demonetization mentions in financial reports confirms that healthcare companies were among the least affected industries (Goel et al., 2022). George et al. (2020) claim that short periods of monetary crisis lead to lower healthcare utilization, not community health. In contrast, my results are consistent with lower healthcare utilization and community health. Additionally, there are several medical case studies using the demonetization event. These are focused on specific workers (Roy et al., 2021), certain districts (Hariharan et al., 2018; Kulkarni, 2019), or specific hospitals (Rao et al., 2017).

Of interest is also a look at the literature on broader macroeconomic determinants of health and health inequalities. The umbrella review of 62 review papers by Naik et al. (2019) notes that there are no systematic reviews of health impacts of monetary policy or large economic institutions like regulatory organizations or central banks. This is a clear indicator of a research gap. Among many aspects, macroeconomic components such as output, unemployment, working conditions, public spending, income, and unaffordable housing have been found to have implications on health. For instance, during the 2008 financial crisis, increased prevalence of cardiovascular disease, diabetes, mental health and suicide were detected (Mucci et al., 2016; Parmar et al., 2016). Furthermore, a higher risk of hypertension was found among Icelandic men, which was partially mediated by changes in work hours and stress levels but not by income changes. Concurrent smoking and body weight adjustments suppressed this increase in the risk of elevated blood pressure. (Asgeirsdottir et al., 2014). Aggregate alcohol and tobacco consumption declined during the financial crisis. However, there has been an increase, especially among those already most at risk (Karanikolos et al., 2016). De Goeij et al. (2015) mention two mechanisms for behavioral changes in alcohol consumption induced by an economic crisis. The first mechanism is the psychological distress that exacerbates an alcohol problem, triggered by unemployment and income loss. The second mechanism is the tighter budget constraint, which reduces money spent on alcoholic beverages. The two mechanisms may cancel each other out. Their review of 35 financial crisis papers suggests an increase in drinking among men, though not among women. Moreover, price and tax increases tend to reduce cigarette consumption (Brown et al., 2014). Because of the elastic response, I would also expect a reduction with decreased income or less cash. In Greece, healthcare spending was reduced during the period of the financial crisis. A shift from private to public healthcare or to street clinics could be observed (Simou & Koutsogeorgou, 2014). Gender, age and income are mitigating factors for health disparities in an economic crisis (Glonti et al., 2015). Nonetheless, one of the most important factors is health insurance. It protects against economic shocks that limit a family's ability to pay for healthcare (Knaul et al., 2006). Because of the insufficient public healthcare system and the high number of poor, I expect very strong effects in the Indian case. In theory, policymakers have three options to sustain the healthcare system during an economic crisis. First, efficiency improvements, extracting more from the available resources. Second, to cut spending by restricting budgets, inputs or the scope of healthcare services. And third, to mobilize additional revenues (WHO et al., 2015). Due to the unexpected shock, efficiency gains were difficult to achieve in the short run. In this situation, further budgetary resources were likewise not conceivable. I, therefore, anticipate a decline in the quality of the health system.

There is a body of work that utilizes the geographic variation in demonetization strength as a natural experiment. Bhavnani and Copelovitch (2018) approximate the demonetization exposure by the total number of bank branches. They find that harder-hit voters did not penalize the ruling party BJP for the economic contraction, which is consistent with a positive view of the policy and its stated objectives. Unlike my analysis, Chodorow-Reich et al. (2020) had detailed information on the daily cash flow of currency chests by note denomination. For the quarter of the demonetization, they show a drop in annual quarterly growth rates of night-light-based GDP, employment, and bank credit by at least two percentage points. Recovery took until the spring of 2017. From October to December 2016, automated teller machine (ATM) withdrawals halved, e-wallet transactions doubled, and point of sales (POS) transactions increased sixfold. They also confirm the demonetization-induced deposit growth. All of their findings are more pronounced in regions with higher shock exposure. My own construction of exposure closely follows the approach of Crouzet et al. (2022). The idea is to proxy the shock by the prominence of currency chests. Newly printed currency was redistributed via those currency hubs. Therefore, the supply of new notes was faster in areas with more currency chests. Their research investigates frictions determining digital payment adoption. Half a year on, adaptation would have been 45 percent lower if there had not been adoption complementarities in favor of policy measures for payment digitization. Das et al. (2022) follow a similar idea, but build the exposure variable on the taluk-level, which is more granular than my district-level. They use it to show that firms with electronic payments in West Bengal reported a higher number of sales to the tax authority. This explains about half of the rather uncharacteristic eleven percent increase in reported sales during the economic downturn. P. Ghosh et al. (2022) have a slightly different approach. They match loan applications with currency chests. Results show that a higher use of cashless payments from borrowers leads to better financing conditions. It increases a borrower's chance of obtaining a loan with a lower interest rate and a larger loan amount. Zhu et al. (2017) create the exposure proxy at the household level. Their approach relies on survey data on the possession of savings in demonetized currency. The small-scale survey finds income losses from demonetization-induced unemployment.

From an in-depth selection of literature on India's demonetization, I chose three potential coping factors. In addition to the papers above, Karmakar and Narayanan (2020) show the strongest temporary expenditure and income decline for the highest income quartile. Transport expenditure played a major role in this reduction. Consumption smoothing happened primarily for food through borrowing from shops and informal sources. Moreover, Wadhwa (2019) finds a more severe consumption reduction in both durable and non-durable goods for richer households. It may well be that rich households have reduced their consumption because the marginal decline in utility was small. They can afford spending cuts because of the possibility to withhold discretionary spending. For the poor, however, it is better to borrow because the marginal effect of consuming less, if you already live at the minimum, is very large. Poorer households needed to maintain basic consumption, which led them to borrow from informal moneylenders. Furthermore, Chanda and Cook (2022) argue for a redistributive nature of the demonetization. Accordingly, poorer regions and poorer households did proportionally better after the demonetization up to spring 2018. Considering that the main option for disposing old banknotes was to deposit them with banks, one can imagine that the structural implementation of the demonetization systematically helped households with bank accounts (Karmakar & Narayanan, 2020). In the first month after the liquidity shock, there was a 43 percent decrease in ATM withdrawals and a 15 percent increase in POS transactions. From October 2016 to January 2020, mobile phone transactions increased by 20 percent and average transaction amounts decreased by 75 percent (Fouillet et al., 2021). Moreover, Singh and Ghosh (2021) use the event to infer that the causal relationship between economic growth and financial inclusion has reversed, suggesting that there was a high motivation for using bank accounts. Banks also became more relevant as microfinance institutions lowered their portfolio at risk (Wu et al., 2022). Joshi (2022) does not find a dampened shock for districts with higher access to cell phones. However, districts with good access to electricity, higher literacy rate, and fewer workers in the workforce did better. Areas with informal sectors had a greater increase in mobile payments and the effect on highly exposed women was twice as high as for highly exposed men. Digital payments even increased consumer spending due to attenuated awareness (Agarwal et al., 2020). In sum, I decided to look at wealth, mobile phones, and bank accounts as potential coping factors.

My thesis also contributes to the literature on macroeconomic models of demonetization. A tentative analysis with an IS-LM model was carried out by Dasgupta (2016). In the money market equilibrium, a fall in the money supply on its own shifts the LM curve leftwards and increases the interest rate. But the difficulty of transactions, lower consumer confidence and lower wealth also shift the IS to the left.[5] In total, the interest rate, therefore, drops or remains the same. On the downside, output is falling. Indeed, the model reproduces the overall macroeconomic behavior of demonetization quite well.[6] Chattopadhyay (2019) extends the IS-LM framework with (incomplete) flexible prices and inflation expectations. Semi flex-prices make the leftward shift in the LM curve less pounced than in the Keynesian case. With revised lower inflation expectations, he argues for a medium-run reduction of output, while being in favor of inflation-targeting regimes. He also points out that by demonetizing high-denomination banknotes, people start hoarding lower-denomination currency. Waknis (2017) looks at demonetization with a segmented market model of connected and unconnected firms and consumers. The unconnected ones rely on cash and could represent the informal sector. For those consumers, consumption and investment falls, which increases the real interest rate, followed by labor supply reduction. The firms cannot pay wages in cash and dismiss employees or shut down. As there is less money demand, the aggregate price level falls. Connected firms and consumers are nothing but positively affected by the lower price level. The aggregate impact depends on the relative importance of the segments.[7] Chodorow-Reich et al. (2020) build the first general equilibrium model for demonetization. It includes a cash-in-advance (CIA) constraint, requiring cash for a fraction of goods. Holding cash also gives a tax evasion advantage. In the closed economy, tradeable and non-tradeable goods are produced. The unanticipated demonetization keeps only a fraction of cash holdings and deposits the rest in the bank. In this situation, the model maintains a predetermined market interest rate. Under a sufficiently large shock, employment, output, and bank lending decline, and more so in greater exposure regions. A numerically solved extension shows that the possibility of endogenous switching to alternative means of payment mitigates those impacts. In turn, this suggests that the shock causes a faster integration of alternative payment systems. I extend the basic structure of this model with health and health consumption. Most recent macroeconomic health models integrate health in a dynamic stochastic general equilibrium (DSGE) setting (Yagihashi & Du, 2015; Yang et al., 2020). In such models, a decrease in the money supply is closely linked to an increase in the interest rate. This is suited for cases like COVID-19 but not for India's demonetization.

[5]Previously rising consumer confidence has been shown to have turned into negative trends as a result of demonetization (Mukhopadhyay, 2019).

[6]With an extension to the IS-LM AD-AS framework: The reduction in money supply shifts the AD to the left. Unanticipated supply chain issues, especially in the informal sector, shift the AS to the left (validated by Subramaniam (2020)).

[7]In India, the informal sector accounts for 81 percent of manufacturing labor and 22 percent of GDP (Ghani et al., 2013; Schneider & Enste, 2000). It is often called the incubator for important frugal innovations.

2 Model

My model extends the demonetization model of Chodorow-Reich et al. (2020) with health and health goods in the Cobb-Douglas composite of consumption.[8] It models the aggregate and cross-regional impact of demonetization on health. A remarkable difference to standard general equilibrium models is that the unanticipated cash crunch does not influence the market interest rate. The closed economy consists of equally sized regions i populated by households. In all regions, firms produce a non-traded good, a non-traded health good, and a specific good ω that is freely traded between regions. Banks and the government act at the federal level. Model proofs are given in Appendix A.

2.1 Model setup

a) Households:
Households consume traded- and non-traded consumption goods, as well as health goods. Health H is essential for composition and increases in the consumption of health goods C^H. Value can be stored in cash M and deposits D. There are two reasons for a household to hold cash. First, because of the cash-in-advance (CIA) constraint, also known as Clower constraint.[9] Essentially, the constraint requires cash payment for some goods. Second, because cash helps to evade taxes. It reduces the effective tax rate. Labor $\bar{N}$ is supplied in-elastically in each region. Every period t, a household has the choice over consumption of tradeables $C^T_{i,t}$, non-tradeables $C^N_{i,t}$, non-tradeable health goods $C^H_{i,t}$, deposits $D_{i,t}$, and cash holdings for the next period $M_{i,t}$. The following maximization problem is solved by the households

$$\max_{C^T_{i,t},\ C^N_{i,t},\ C^H_{i,t},\ D_{i,t},\ M_{i,t}} \sum_{t=0}^{\infty} \beta^t \left[U(C_{i,t}) - f(\zeta_{i,t})\right]$$

, subject to

$$P_{i,t}C_{i,t} + D_{i,t} + M_{i,t} \leq R_{t-1}D_{i,t-1} + M_{i,t-1} + (1-\tau(\eta_{i,t}))\, W_{i,t}N_{i,t} + T_{i,t}, \tag{1}$$

$$\kappa(\zeta_{i,t})P_{i,t}C_{i,t} \leq M_{i,t-1} + T^M_{i,t}, \tag{2}$$

$$C_{i,t} = (C^T_{i,t})^{\alpha_1}(C^N_{i,t})^{\alpha_2}(H(C^H_{i,t}))^{\alpha_3} \tag{3}$$

Variables are nominal and expressed in INR, except for C, H, ζ, and N.
Equation (1) gives the budget constraint. $\tau(\eta_{i,t})$ is the effective labor income tax rate with $-1 < \tau(\eta_{i,t}) < 0$, where $\eta_{i,t} = \frac{M_{i,t}}{W_{i,t}N_{i,t}}$ is the ratio of cash balances to labor income from period t. It captures tax evasion by means of cash. $T_{i,t}$ includes cash and non-cash transfers from the government.
Equation (2) gives the CIA constraint. Fraction $0 < \kappa(\zeta_{i,t}) \leq 1$ requires a cash payment. Here, $\zeta_{i,t}$ is the finance technology accounting for the shift to alternative payments. Assume there is no access to finance technology. $\kappa(0) = \bar{\kappa}$, $\kappa'(\zeta_{i,t}) = 0$, $f(0) = 0$

[8]No closed-form solutions with models of health in the utility (De Nardi et al., 2016; Finkelstein et al., 2013; Palumbo, 1999).
[9]À la Lucas (1982), Lucas and Stokey (1987), and Svensson (1985).

$f'(\zeta_{i,t}) = 0$.[10] Cash payments can be made with money holdings from last period $M_{i,t-1}$, or cash transfers from the government $T^M_{i,t}$.
Equation (3) gives the Cobb-Douglas composite of consumption.[11] The consumption aggregate consists of health, traded, and non-traded goods.[12] The total consumption of traded goods is an aggregate of goods from different regions $C^T_{i,t} = \left(\int_0^1 C^T_{i,t}(\omega)^{\frac{\sigma-1}{\sigma}} \, d\omega\right)^{\frac{\sigma}{\sigma-1}}$.
Health faces decreasing, or constant returns to health consumption, $H(C^H_{i,t}) = (C^H_{i,t})^\rho$, with $0 \leq \rho \leq 1$. The price aggregate is

$$P_{i,t} = (\alpha_1^{\alpha_1}\alpha_2^{\alpha_2}(\alpha_3\rho)^{\alpha_3})^{-1}\,(P^T_t)^{\alpha_1}(P^N_{i,t})^{\alpha_2}(P^H_{i,t})^{\alpha_3}, \text{ where } P^T_t = \left(\int_0^1 P^T_t(\omega)^{1-\sigma}\, d\omega\right)^{\frac{1}{1-\sigma}}$$

b) Banks and Firms:
Perfectly competitive banks can take deposits and grant loans. At interest rate R_t, the government can borrow A^g_t and perfectly competitive firms can borrow $A^f_{i,t}$. For the market to clear, $\int_i A^f_{i,t} + A^g_t \, di = \int_i D_{i,t} \, di$. A working capital constraint applies to firms. A fraction φ of the wage has to be paid in advance. For this reason, firms take a bank loan $B^f_{i,t} = \varphi W_{i,t} N_{it}$. Production functions are $Y^T_t = N^T_t$, $Y^N_t = N^N_t$, and $Y^H_t = N^H_t$. In perfect competition, price is equal to marginal cost, hence

$$P^T_t(\omega) = P^N_{i,t} = P^H_{i,t} = (1 + \varphi(R_t - 1))W_{i,t}$$

c) Wage setting:
Nominal wages are downward rigid, $W_{i,t} \geq \gamma W_{i,t-1}$.[13] When the constraint is not binding, $N_{i,t} = \bar{N}$. With immobile labor, the complementary of slackness condition is $(\bar{N} - N_{i,t})(W_{i,t} - \gamma W_{i,t-1}) = 0$.

d) Government and market clearing:
The government is responsible for the collection of labor income taxes, transfers to households, issuing of bonds $B^g_{i,t}$, and printing and destroying of money $T^M_{i,t} = M^s_{i,t} - M^s_{i,t-1}$. The government's budget constraint is

$$\int_0^1 \left(M^s_{i,t} + B^g_{i,t} + \tau(\eta_{i,t})W_{i,t}N_{i,t}\right) \, di = \int_0^1 \left(T^M_{i,t} + T^g_{i,t} + M^s_{i,t-1} + R_{t-1}B^g_{i,t-1}\right) \, di$$

Traded goods clear countrywide, $\int_i C^T_{i,t}(\omega)\, di = Y^T_t(\omega)$. Non-traded and health goods clear by region, $C^N_{i,t} = Y^N_{i,t}$, $C^H_{i,t} = Y^H_{i,t}$. Money demand equals money supply $M_{i,t} = M^s_{i,t}$, and loan demand matches its supply, $B^f_{i,t} = A^f_{i,t}$ and $B^g_t = A^g_t$.

2.2 Demonetization shock

In period 0, there is a cash crunch. The government unexpectedly declares only a fraction of cash from period -1 as legal tender in period 0. The remaining cash is deposited at

[10] In Proposition 3 of Chodorow-Reich et al. (2020), they look at a non-uniform demonetization with an endogenous κ. Their numerical illustration shows a higher adoption of financial services in regions of higher demonetization. As the effective cash shortage $\frac{Z_i}{\kappa_{i,0}}$ is smaller than the actual cash shortage Z_i, the effect on consumption and output is attenuated. Therefore, I also expect a smaller health drop with access to financing technology.

[11] Similar to Burstein and Gopinath (2014).

[12] Output elasticities are $0 \leq \alpha_1 \leq 1$, $0 \leq \alpha_2 \leq 1$, and $0 \leq \alpha_3 \leq 1$ with $\alpha_1 + \alpha_2 + \alpha_3 = 1$.

[13] À la Schmitt-Grohé and Uribe (2016). Kaur (2019) advocates that wages never fall in India, $\gamma = 1$. Confirmed by Chodorow-Reich et al. (2020).

a predetermined interest rate R_{-1}. This brings the deposit Euler equation (A.3) out of balance. The CIA constraint does not bind in period -1 due to the tax advantage of holding cash. In period 1, the money supply meets the quantity for full employment. Note that there is no uncertainty after the demonetization. In Proposition 1, I look at a uniform demonetization across regions. I assume a large enough demonetization shock for the CIA and wage constraint to bind in period 0.

Proposition 1: Uniform demonetization shock

The demonetization shock is $Z = \frac{M_0^s}{M_{-1}^s} = \frac{M_0}{M_{-1}}, \in (0,1)$. With the restrictions (A.17), and (A.15), the CIA constraint binds in period 0, $M_0 = \bar{\kappa} P_0 C_0$ and does not bind in period -1, $M_{-1} > \kappa P_{-1} C_{-1}$.[14] Restriction (A.16) lets the wage constraint bind in period 0, $W_0 = \gamma W_{-1}$.

$$\frac{H_0}{H_{-1}} = \left[\frac{Z}{\gamma} \frac{(1-(1-\rho)\alpha_3)\eta_{-1}}{\bar{\kappa}\left(1+\varphi\left(\frac{1}{\beta}-1\right)\right)} \right]^{\rho} \tag{4}$$

From Equation (4) follows that a stronger demonetization shock Z intensifies the health drop. It arises from the binding CIA constraint, linking cash to output in period 0, $Y_0 = C_0$. Therefore, cash balances to labor income also fall $\eta_0 < \eta_{-1}$, increasing the effective labor income tax rate $\tau_0 > \tau_{-1}$. Because of the inelastic labor supply, it is not distortionary. As a result, the shadow interest rate, consistent with the deposit Euler equation (A.3), increases $R_0^s \equiv \frac{1}{1-\nu\bar{\tau}(\eta_0)} > R_{-1} = \frac{1}{1-\nu\bar{\tau}(\eta_{-1})}$. A higher wage rigidity γ, initial (no access to finance technology $\zeta = 0$) consumption requiring cash $\bar{\kappa}$, the fraction of wage paid in advance φ, and output elasticity of health α_3 increase the health impact. A lower ratio of cash balances to labor income in the last period η_{-1} and the discount factor β decrease the health impact. Output elasticity of health consumption ρ has a convex influence. If $\rho = 0$, health is always 1. There is no health consumption. If $\rho = 1$, there is a one-to-one influence. Hence, the impact is the same as on health consumption C_t^H. Next, I look at the impact on regions with different demonetization exposure, which constitutes the natural experiment in my empirical analysis. I assume cross-border financial markets do not offset the demonetization.

Proposition 2: Non-uniform demonetization shock

The demonetization shock varies across regions $Z_i = \frac{M_{i,0}^s}{M_{-1}^s}, \in (0,1)$. With the restrictions (A.20), and (A.15), the CIA constraint binds in period 0, $M_{i,0} = \bar{\kappa} P_{i,0} C_{i,0}\,, \forall i$ and does not bind in period -1. Restriction (A.19) lets the wage constraint bind in period 0, $W_{i,0} = \gamma W_{-1}\,, \forall i$.

$$\frac{H_{i,0}}{H_{i,-1}} = \left[\frac{Z_i}{\gamma} \frac{(1-(1-\rho)\alpha_3)\eta_{-1}}{\bar{\kappa}\left(1+\varphi\left(\frac{1}{\beta}-1\right)\right)} \right]^{\rho} \tag{5}$$

[14] With a binding CIA constraint in period 0, the model can be solved without the solutions for period 1 and subsequent periods. That is, because the interest rates are predetermined at R_{-1} and the Euler equations for money Equation (A.2) and deposits Equation (A.3) become irrelevant. Several values of M_1 lead to a return to full employment. I choose the minimum level, where equilibrium wage needs to fulfill $W_1 > \gamma W_0 = \gamma^2 W_{-1}$ and downward wage rigidity is not binding. With $\gamma \approx 1$, there is a complete return to cash pre-demonetization in period 1, $M_1 \approx M_{-1}$.

According to Equation (5), regions with a higher demonetization exposure Z_i face a stronger health drop. Parameters play a similar role as with a uniform shock in Equation (4).

2.3 Summary: Model

My health-demonetization model shows that a cash crunch leads to a reduction in health, both overall and intensified in more affected regions. The effect propagates by the reduction in health consumption. My model keeps the same structure for output and employment effects as in Chodorow-Reich et al. (2020). Note that in my model, an increase in health spending is associated with an improvement in health. When it comes to health behaviors like tobacco and alcohol usage, less is more. Therefore, those commodities would appear twice in the model, each time with different weights: once with a negative sign for health consumption and once with a positive sign in the remaining consumption goods. Additionally, the state of the overall healthcare system is not represented. Hypothetically, a change could affect household consumption patterns.

3 Data and Summary statistics

For my analysis, I use the 2015-16 Indian National Family Health Survey (NFHS-4) from the Demographic Health Surveys (DHS).[15] It is a detailed data set on individual health data with a focus on women. Among a variety of variables, it includes information on anthropometry, GPS location, measurable health values, and health issues. For my relevant variables, women aged 15-49 and men aged 15-54 were surveyed. Fieldwork was conducted from January 20, 2015, to December 7, 2016.[16] That is 29 interview days after the demonetization on November 8, 2016, which gives me the opportunity to look at short-term impacts. In this phase, interviews were carried out in the states Arunachal Pradesh, Jammu & Kashmir and Jarkhand. I take all respondents from those three states as my research units. The dataset used, therefore, covers the period from January 29, 2016, to December 7, 2016. I further use two datasets from the Reserve Bank of India (RBI, 2022). One is bank deposit data as of March 2016, the other is bank branch data on bank structure and location as of 2022.

3.1 Variable construction

A timeline of the average number of interviews per day in the three states studied is shown in Figure B.1. They steadily decreased from November until the end date. The daily average of all dependent health variables is given in Figure B.3.

3.1.1 Construction: Demonetization shock

For the construction of my heterogeneous exposure variable, I use the relative prominence of chest banks in a district. Chest banks are commercial banks assigned with the task

[15]DHS is part of the United States Agency for International Development (USAID). The datasets Household Member Recode (PR), Individual/Women's Recode (IR), Men's Recode (MR), Geographic Data and Geospatial Covariates are used (IIPS & ICF, 2017).

[16]The NFHS-4 report states the end to be December 4, 2016, but I am referring to the actual dataset.

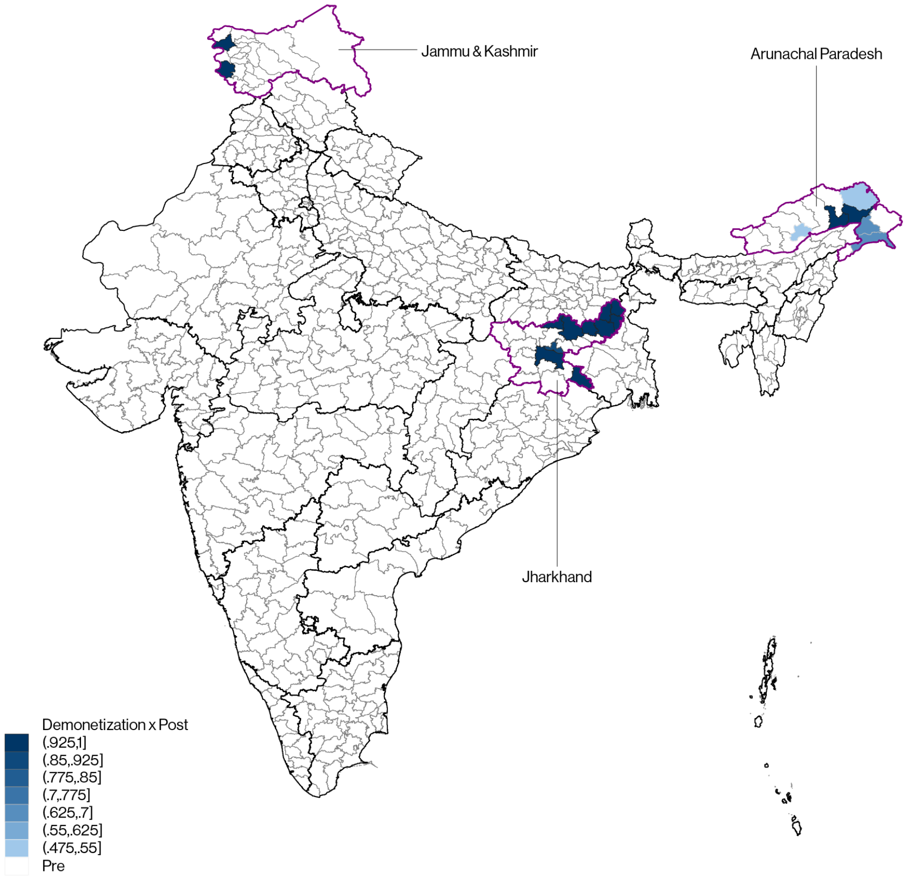


Figure 1: Map of district demonetization exposure

of cash management by the RBI. Newly printed banknotes reach them first and are then distributed locally to other banks. The amount of deposits varies in currency chests and some districts have none at all. Notably, these institutions had been established for a long time and were not a result of the demonetization. I assume that districts with a high share of currency chests in the banking market experienced a lower demonetization. The assumption is mainly based on the idea of faster recirculation of banknotes, but also based on potential biases of chest banks towards their own customers. For example, the newspaper article by Lokeshwarri (2016) advises that one should make sure to have a bank that is well linked to a currency chest. I follow Crouzet et al. (2022) for the specific approximation of the importance of chest banks in a district. It is measured by the market share of deposits they hold $\frac{D_d^c}{D_d}$. I use bank deposit data from March 2016, bank branch data from 2022, and currency chest data from 2022. It is possible to combine different years, as currency chest locations have been stable over the last years (Das et al., 2022). Likewise, the total number of banks per district appears to have stayed fairly constant over time. Information on deposits per district is only available for five bank types G_d.[17] In each district, I scale the total deposits of a bank type D_{gd} by the relative amount of

[17] Classified by the RBI: foreign banks, regional rural banks, nationalized banks, private sector banks, and State Bank of India (SBI) and its associates.

chest banks $\frac{N_{gd}^c}{N_{gd}}$. The local importance of chest banks can then be constructed as follows.

$$chest_d = \frac{D_d^c}{D_d} \approx \frac{1}{D_d}\left(\sum_{g \in G_d} D_{gd}\left(\frac{N_{gd}^c}{N_{gd}}\right)\right) \quad (6)$$

For an interpretation of the exposure to the demonetization shock, I simply take the converse of Equation (6), $ex_d = (1 - chest_d)$.[18] A higher value indicates a stronger exposure. In the states Arunachal Pradesh, Jammu & Kashmir, and Jarkhand there were 272 banks with 67 operating as currency chests. Of the total of 62 districts, surveys were conducted in 19 after demonetization. Figure 1 shows a map with exposure of those districts. There was intra-district variation, as in all districts with post-demonetization interviews, pre-interviews were also conducted. The distribution of the proxy for demonetization exposure in Figure B.2 is right-tailed both for districts with only interviews before demonetization and districts with interviews before and after demonetization.[19] Accordingly, the districts studied were rather strongly affected by the shock. Partly, this is explained by the fact that the studied districts were in rural areas where there were few currency chests. A limitation of my method is that I do not take into account that chest banks also supply neighboring regions.

3.1.2 Construction: Blood pressure

For each respondent, the NFHS-4 staff measured systolic and diastolic blood pressure three times at five-minute intervals. Observations with missing blood pressure values in any of the three measurements, any problem during sampling, or unrealistic blood pressure readings are excluded from my analysis. Unrealistic means a systolic blood pressure less than 60 mmHg or greater than 250 mmHg, a diastolic blood pressure smaller than 30 mmHg or greater than 250 mmHg, or a diastolic blood pressure greater than a systolic blood pressure (Shivashankar et al., 2021). I kept all age groups of participants. I then took the average of the three readings for systolic and diastolic blood pressure. Figure 2a shows the histogram for systolic blood pressure before and after the demonetization. In the absence of controls, the right shift gives the first indication that an increase has occurred, which is similar for the diastolic blood pressure in Figure 2b. Nonetheless, the time trends for both measures show fluctuations and a rise from about the beginning of October for systolic blood pressure and the end of October for diastolic blood pressure. The peaks of the deflections were around the demonetization. The return to the average at the end of the time series could indicate a short-lived increase. However, it could also be driven by the decrease in the number of interviews per day. I do not consider that the increase that started approximately one month before the demonetization was related to the almost exogenous shock. Rather, I suspect a seasonal trend and an influence of the survey being conducted region by region. For example, high daily averages could be attributed to interviews conducted in mountainous regions. The correlation between elevation and blood pressure is medically known and is accounted for in the regressions. A combination of the two readings is hypertension or elevated blood pressure. The binary

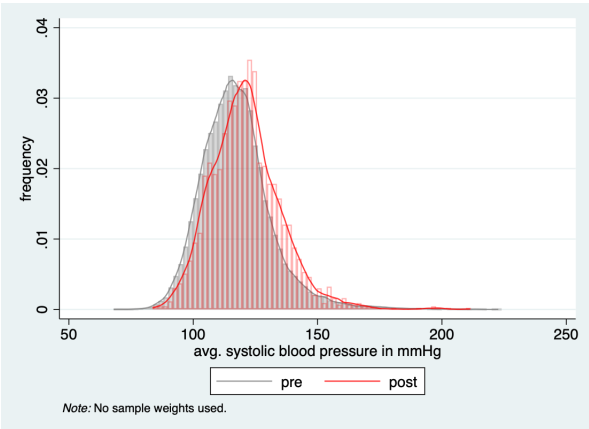
[18] Logarithmized (ln) and called ex_{ds} in Section 4 and Demonetization in Section 5. The Dibang Valley district has more deposits in currency chests than banks, which results in a negative ex_d. As every district was hit by the shock, I exchange this value with the second lowest ex_d.

[19] Demonetization exposure before the effective date is required for the DiD approach.

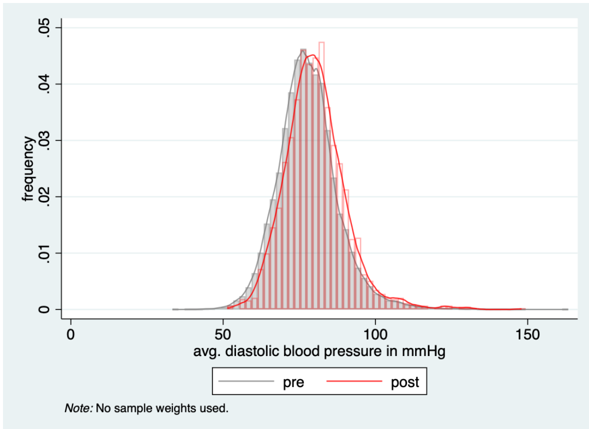
variable is 1 for having the disease. Prevalence of hypertension is given, if the systolic blood pressure is at least 140 mmHg, the diastolic blood pressure is at least 90 mmHg, or the subject is currently taking medicine to lower blood pressure (Shivashankar et al., 2021). As expected, given the two blood pressure measures, there were on average more people with hypertension post-demonetization (Figure 3a). Likewise, this is shown in the image of the time trend.

3.1.3 Construction: Glucose level

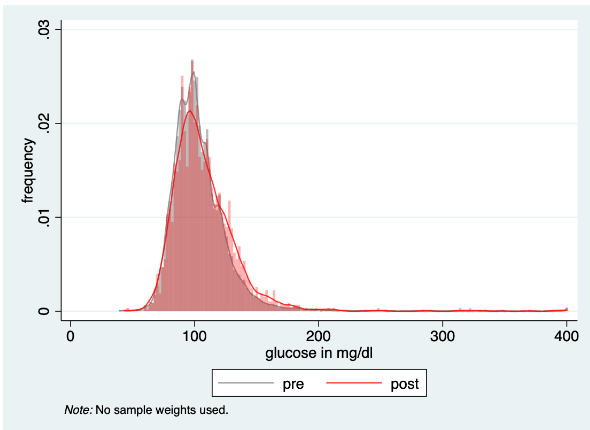
NFHS-4 staff randomly collected blood samples from the finger to assess respondents' glucose levels. Observations with less than 39 mg/dl, greater than 1000 mg/dl and any problem during sampling are excluded from my analysis. I then replaced all data points greater than 400 mg/dl with 400 mg/dl (Shahid & Lewis, 2022). Note that blood glucose and blood pressure typically correlate with each other. In comparison, the histogram has not shifted but has become flatter and somewhat more right-tailed after the demonetization (Figure 2c). This is related to a larger variation in November and December 2016.



(a) Average systolic blood pressure in mmHg

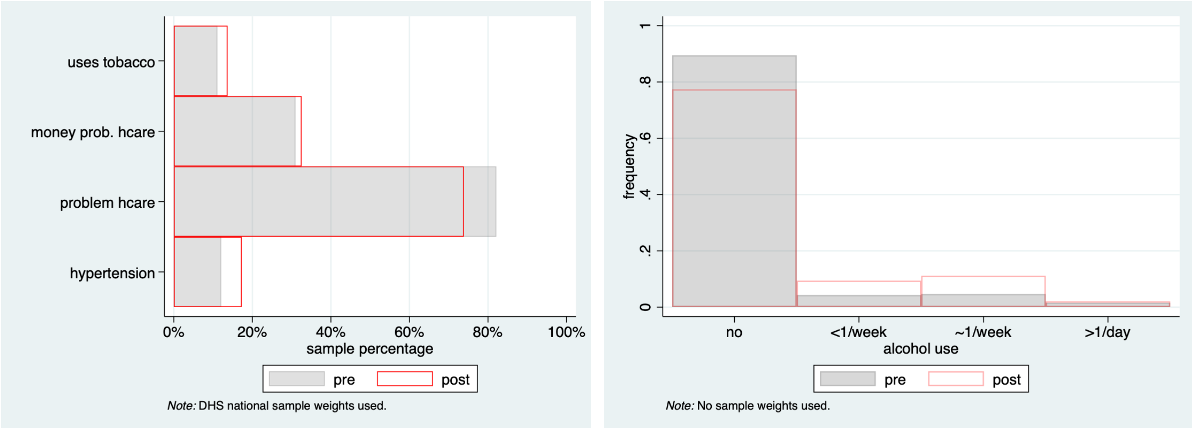


(b) Average diastolic blood pressure in mmHg



(c) Glucose level in mg/dl

Figure 2: Histograms: Continuous variables



(a) Bar chart: Binary variables

(b) Histogram: Alcohol use

Figure 3: Binary and ordinal variables

3.1.4 Construction: Alcohol use

Respondents in the NFHS-4 were asked to answer about their alcohol consumption behavior on a 4-level scale. I define 0 as no alcohol, 1 as less than once a week, 2 as about once a week, and 3 as almost every day. Note that this sequence is ordinal. The histogram shows a right shift for post-demonetization. More participants answered with less than once a week or about once a week. However, severe alcoholism with consumption of more than once per day remained the same (Figure 3b). Only few days after the demonetization in November, there was a sharp increase in the average from approximately 0.05 to 0.6. This deflection was greater than previous ones, so it seems that it could be linked to the cash crunch.

3.1.5 Construction: Tobacco use

In the NFHS-4 questionnaire, respondents also indicated whether they use different types of tobacco. These include smoking any type of cigarette and using any chewing tobacco or snuff. I combine them into a binary variable that indicates whether someone uses tobacco by 1. On average, more respondents used tobacco post-demonetization (Figure 3a). In November, after demonetization, there was a slight increase in the average consumption of tobacco. However, it appears to remain within the variation range of the previous months.

3.1.6 Construction: Problem accessing healthcare

Women in the NFHS-4 were asked about potential problems with medical care in the event of illness. These include obtaining permission, getting money, the distance to a healthcare facility, transportation, finding an accompanying person, the availability of a female provider, and finding a provider. Females were particularly questioned about whether or not the specific problems constituted a big problem for them. I create a binary variable, being 1 for having at least one of the mentioned big problems in accessing healthcare. Counterintuitively, there were on average fewer big problems after the demonetization (Figure 3a). Yet, immediately following the demonetization, the daily average rose sharply from below the yearly average to above. In mid-November, almost all reported at least one big problem. December shows a large downward deflection far below the yearly average that was rather untypical for the rest of the year. This, in turn, lowers the post-demonetization average of Figure 3a.

3.1.7 Construction: Money as problem accessing healthcare

As part of the potential big problems with medical care, NFHS-4 interviewers asked women if getting money for treatment is their big problem. I define 1 as having the problem. The intuitive assumption that this problem occurs more frequently when less cash is in circulation is on average only confirmed to a limited extent (Figure 3a). A short-lived increase after the demonetization remained more or less within the fluctuation range of previous months.

3.2 Summary statistics

Table 1: Summary statistics

	Mean	Std.dev.	P10	Median	P90	Count
Pre						
Demonetization	0.93	0.10	0.81	0.97	1.00	76429
Hypertension	0.14	0.35	0.00	0.00	1.00	67988
Avg. systolic bp	117.41	14.37	101.00	116.33	134.00	67988
Avg. diastolic bp	77.88	9.94	66.00	77.33	90.00	67988
Glucose level	103.95	25.10	81.00	100.00	128.00	74601
Alcohol use	0.18	0.58	0.00	0.00	1.00	76429
Tobacco use	0.13	0.34	0.00	0.00	1.00	76429
Problem healthcare	0.84	0.37	0.00	1.00	1.00	64663
Money prob. healthcare	0.34	0.47	0.00	0.00	1.00	64663
Post						
Demonetization	0.91	0.15	0.67	0.99	1.00	2933
Hypertension	0.19	0.39	0.00	0.00	1.00	2157
Avg. systolic bp	121.14	14.18	104.33	120.33	138.33	2157
Avg. diastolic bp	80.28	10.08	68.33	79.67	92.00	2157
Glucose level	107.83	28.93	82.00	102.00	136.00	2891
Alcohol use	0.38	0.76	0.00	0.00	2.00	2933
Tobacco use	0.20	0.40	0.00	0.00	1.00	2933
Problem healthcare	0.79	0.41	0.00	1.00	1.00	2477
Money prob. healthcare	0.34	0.48	0.00	0.00	1.00	2477

Note: No sample weights used.

My data includes 79,362 individuals with 2,933 interviewed post-demonetization. Females are disproportionately represented by 84.61 percent pre and 84.45 percent post. For a summary statistics of demonetization exposure and dependent variables pre- and post-demonetization, see Table 1. The demonetization exposure has a mean and median close to the maximum. Post-demonetization, the minimum is 0.5 and the 90 percent decile is at maximum. The interdecile range is 0.19. This all suggests that most districts were affected by a fairly strong demonetization. Not all health values were recorded from all subjects. Blood pressure measures and glucose level are normally distributed around a realistic medical mean. The average of systolic blood pressure increased by 3.18 percent, diastolic blood pressure by 3.08 percent, and glucose level by 3.73 percent. Hypertension increased from 14 percent to 19 percent. The upper decile changed from drinking alcohol less than once a week to about once a week. 20 percent used tobacco of any kind post-demonetization, which was an 11 percent increase. There was a 5.95 percent reduction to 79 percent of women reporting any big problem in accessing healthcare. In terms of money as the problem, it remained at 34 percent. Before the demonetization, of the respondents, 59.15 percent were considered poor, 92.40 percent had a bank account, and 91.49 had a mobile phone. After the demonetization, 55.10 percent were considered poor, 92.39 percent had a bank account and 93.08 percent had a mobile phone. See Table B.1 for a summary statistics of all covariates. For a detailed explanation with respect to the surveying, I refer the reader to the NFHS-4 documentation.

4 Empirical strategy

To identify causal effects of the demonetization event on a range of relevant health variables, I compare people interviewed in the NFHS-4 before and after the shock. My identification utilizes the regional variation in demonetization exposure as a natural experiment. It relies on the exogeneity of the demonetization and the interview dates. Neither the demonetization can be reasonably assumed to have influenced the allocation of the interviews, nor the interviews the demonetization. This is especially true because the demonetization was only foreseeable in the narrowest government circle. But it is also true because the interviews were conducted according to a plan by the DHS. Remember that the demonetization occurred at the end of the NFHS-4 survey wave. After almost two years of study implementation, I assume that there were no major structural changes in the final phase. Although there was a small increase in interviews per day in the days around the demonetization followed by a steady decline until the final day (Figure B.1).

There is a potential endogeneity of the exposure with my dependent health variables. It is plausible that the strength, in my case the relative number of deposits in currency chests, is related to the economic, social and health characteristics of a district. Therefore, these are potentially omitted variables. To overcome the endogeneity problem, I use a pooled cross-section difference-in-differences (DiD) approach. The first differences pre-demonetization account for any potential, unobservable, time-invariant characteristics that are correlated with health and exposure.

I assume parallel trends between the exposure (treatment) groups and the lowest exposure (control) group. Meaning, if the treatment groups had experienced the lowest exposure, they would have had the same trend as the control group. This is important for the validity of the DiD approach. I have two reasons why this assumption is plausible. First, average pre-determined individual characteristics are roughly the same for pre and post with only diabetes standing out. However, note that, as expected for interviews conducted at different locations in time, the geospatial average characteristics vary (Table B.1). Second, Crouzet et al. (2022) show that their similarly created exposure variable's effect on consumption is not driven by pre-trends.

Given that the control group was also affected by demonetization, their change is of interest. It is possible that demonetization harmed all but the degree of exposure is irrelevant. With the sluggish remonetization in the first weeks in all areas, this is also not unlikely. Therefore, I assume constant other policies and economic shocks. It is a strong assumption that may not hold. Nevertheless, even if it does not, my interpretation of the treatment effects holds.

Furthermore, I assume populations pre and post are not biased in uncontrolled variables that predict my health variables. Due to the elaborate sampling method of DHS and my detailed control variables, I see this assumption as realistic.

For continuous variables, I assume standard ordinary least squares (OLS) assumptions. Since the Gauss-Markov theorem and the normality of the error term do not hold for binary and ordinal variables, I use logit and ordered logit (proportional odds) models.[20] Furthermore, predicted probabilities of a linear probability model (LPM) would not be bounded in both cases. For binary variables, I assume standard logit assumptions. In addition, I assume proportional odds for the ordered logit model. It is disputable whether the change from drinking alcohol less than once a week to about once a week is the same as changes from no consumption to higher levels or from once a week to every day. Nonetheless, the added value of the categories compared to a binary assessment and the ease of interpreting the coefficients support the use of an ordered logit model.

To test for health impacts, I estimate Equation (7) as my main specification. Here, y_{idst} is the health outcome of interest for individual i, in district d and state s, interviewed on day t. $post_t$ is a dummy which is 1 if the survey took place after the demonetization. My continuous treatment variable is the natural logarithm of the demonetization exposure ex_{ds} explained in Section 3. X_{idst} are various controls to account for other health determinants. I mainly follow S. Ghosh and Kumar (2019) for the choice of controls. Depending on the outcome variable, it includes individual, blood pressure and glucose controls. If applicable, I add food, occupation, and geospatial controls in robustness checks, which are all possible important health determinants. However, geospatial controls are less supported from a medical perspective. Therefore, they might be unwanted irrelevant variables. With overspecification, the estimates remain unbiased, however, the standard errors increase. Furthermore, food and occupational controls may well have adapted endogenously to the shock. Consequently, I do not include the three control categories in my main results. I incorporate all state-specific, time-invariant factors by including state-fixed effects (FE) λ_s. The error term is ε_{idst}.

$$y_{idst} = \beta_0 + \beta_1 \, post_t + \beta_2 \, ex_{ds} + \beta_3 \, (post_t \times ex_{ds}) + \gamma \, X_{idst} + \lambda_s + \varepsilon_{idst} \tag{7}$$

The main coefficient of interest is β_3. It is the average treatment effect on the treated (ATT). In other words, β_3 denotes the distinct changes from pre to post in the average outcome variable for the exposure groups compared to the control group. β_1 gives the change for the lowest exposure (control) group. β_0 is a constant that gives the average outcome variable before the demonetization for the control group. β_2 is the pre-difference for treated and control.

To account for covariate shocks, I include a robustness check with survey month-fixed effects λ_t in Equation (8). Keep in mind that only 44 people were interviewed in January and 69 in December.

$$y_{idst} = \beta_0 + \beta_1 \, post_t + \beta_2 \, ex_{ds} + \beta_3 \, (post_t \times ex_{ds}) + \gamma \, X_{idst} + \lambda_s + \lambda_t + \varepsilon_{idst} \tag{8}$$

[20]For a tangible interpretation, I opted for logit rather than probit.

In order to identify possible reinforcing or attenuating determinants of the health impacts, I extend Equation (7) in Equation (9) with triple interaction terms. The determinant z_{idst} is interacted with the previous DiD term. It can indicate whether a person belongs to the poorer half, has a mobile phone, or has a bank account. I define the poorer half as being below the median of national household wealth.[21] Endogenous adjustment of all factors was found in the literature. Increasing use of mobile phones and bank accounts and lower wealth could therefore bias the results towards zero.

$$\begin{aligned} y_{idst} = & \beta_0 + \beta_1 \, post_t + \beta_2 \, ex_{ds} + \beta_3 \, (post_t \times ex_{ds}) + \beta_4 \, (z_{idst}) \\ & + \beta_5 \, (post_t \times z_{idst}) + \beta_6 \, (ex_{ds} \times z_{idst}) + \beta_7 \, (post_t \times ex_{ds} \times z_{idst}) \\ & + \gamma \, X_{idst} + \lambda_s + \varepsilon_{idst} \end{aligned} \tag{9}$$

In addition to the coefficients above, β_5 and β_7 are of interest. β_7 indicates the difference in the ATT for those with the determinant. The difference in change for those in the control group with the determinant is given by β_5.

Ideally, one clusters at a level featuring correlation within clusters, but not between clusters. DHS's NFHS-4 forms their primary sampling units (PSUs) in their sampling procedure in exactly this way. Thus, clustering for sampling assignment on PSU-level is accurate. But with my district-level treatment variable, clustering for treatment assignment would be accurate on a district-level. Since I cannot cluster at both levels and my health data varies widely within districts, sampling clustering at the PSU seems to be the right choice. This is also recommended by DHS. Clustering at the district-level would lead to more conservative standard errors and most likely to less significant results. Since I follow the DHS clustering, I also use their stratification level called Strata. In the following section, regressions are weighted by DHS sample weights. These are composed by state and urban/rural, and within major cities by slum/non-slum.[22]

5 Empirical results

In each result table, Column (1) shows the results of my main specification Equation 7. All columns include state-fixed effects and individual controls. The latter are gender, age, body mass index (BMI), (6-level) education, urban/rural living, inhabited altitude, (4-level) frequency of alcohol use, tobacco use, diabetes (yes, no, do not know), use of medicine to lower blood pressure, told had high blood pressure, and a (5-level) wealth status. If one of the individual control variables is the variable under study, it is omitted.[23] The specification of Equation 9 with triple interaction terms is given in Column (2) for being poor, in Column (3) for having a mobile phone, and in Column (4) for having a bank account. The robustness check of Equation 8 with survey month-fixed effects is shown in Column (5). Columns (6)-(8) include food, occupation and geospatial controls respectively.[24] The last column always contains all controls without month-fixed

[21] Household wealth is determined by DHS through a principal component analysis based on the number and type of consumer goods they own. Ranging from a television to a bicycle or car, up to housing features such as toilets, sources of drinking water, and flooring.

[22] Econonmetric analysis was performed in Stata©/SE 17.0.

[23] Section 5.3 omits gender because only females are examined. With geospatial controls, urban/rural is replaced with a population index.

[24] For health behavior in Section 5.2 and health system characteristics in Section 5.3, food controls are left out. In this context, they do not play a role.

effects. Missing data points explain the lower number of observations in Column (4) and the columns for occupational and geospatial controls. Food controls include if a person regularly eats pulses/beans, dark green leafy vegetables, fruits, eggs, fish, meat, fried food, or regularly drinks aerated drinks. Occupation controls are branches of employment including no employment, professional/technical/administrative/managerial, clerical, sales/services, agricultural, manual, and if a person did not know. A disadvantage of occupational controls is the much smaller number of observations. Geospatial controls are more detailed area-specific variables. They include a population index (2014), average monthly temperature (1950-2000) in the survey month, slope for roughness of the terrain (1996), purchasing power parity (PPP, 2005), nightlight (2015), a vegetation index (2015), and an aridity index (2015).

5.1 Health conditions

As indicators of health conditions, I consider glucose level and two blood pressure measures grouped into hypertension. Note that all variables are strongly correlated with each other. Only diastolic blood pressure was proportionally higher in regions with greater exposure. Yet, there was a general worsening in all health conditions.

5.1.1 Empirical results: Blood pressure

Blood pressure controls are used in all tables of this section. These include time of blood pressure measurement, arm circumference, a (3-level) cuffsize, and ate, drank a coffee or tea, smoked, or used another sort of tobacco 30 minutes before the measurement.

Table 2 gives the results of the logit regression for hypertension. Since it is partly defined by taking antihypertensive drugs, I exclude it from the individual controls. I assume the information about high blood pressure was given before the demonetization. Because of the correlation with glucose level, I also assume the information about having diabetes was given before the demonetization. The main coefficient of interest is Post×Dem. in Column (1). It is equal to 1.010 and significant at a 10%-level. After the shock, holding all other variables constant, it predicts a 0.010 units log-odds increase of having hypertension for every one percent higher exposure. Taking the exponential gives the odds ratio of 1.010. This means that post-demonetization, a one percent higher exposure increased the odds of having hypertension by 1.010 percent.[25] The second coefficient in Column (1), Post, gives the change in the control group. Those with the lowest exposure had a log-odds increase of 0.243 units, again significant at a 10%-level. The only significantly mitigating factor was the possession of a bank account in Column (4). The inclusion makes the difference in exposure groups insignificant and the overall increase highly significant. With a bank account, the effect stays roughly the same as in Column (1). But without one, the log-odds increase by 0.791 units. With the inclusion of food controls in Column (6), the coefficient for Post is smaller and for Post×Dem. higher. Therefore,

[25]Remember, if the odds ratio is < 1, increasing values of the covariate correspond to decreasing odds for the outcome to be 1. If the odds ratio is > 1, increasing values correspond to increasing odds. I provide an example of being in the most exposed group. In the data, exposure of the highest group is 102 percent higher than for the control group. Multiplying the coefficient 1.010 with the natural logarithm of 2.02 gives 0.710, the unit change of the log-odds. Taking the exponential gives 2.034. Corresponding to 103.425 percent higher odds for the most exposed, compared to the control group. One can directly calculate this number by taking 2.02 to the power of 1.010.

Table 2: Results: Hypertension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.243*	0.239	0.076	0.997***	0.029	0.237*	0.200	0.141	0.106
	(0.131)	(0.175)	(0.271)	(0.348)	(0.168)	(0.130)	(0.213)	(0.132)	(0.221)
Post×Dem.	1.010*	1.647	0.369	1.872	0.876	1.078*	0.540	0.949	0.635
	(0.586)	(1.431)	(1.508)	(1.289)	(0.592)	(0.592)	(1.105)	(0.584)	(1.120)
Post×Poor		0.024							
		(0.234)							
Post×Poor×Dem.		-0.814							
		(1.593)							
Post×Phone			0.179						
			(0.306)						
Post×Phone×Dem.			0.686						
			(1.673)						
Post×Bank				-0.791**					
				(0.333)					
Post×Bank×Dem.				-0.786					
				(1.413)					
Observations	69363	69363	69363	69295	69363	69363	23121	69051	23062
Mean dep. var.	0.140	0.140	0.140	0.140	0.140	0.140	0.155	0.140	0.155
p-value	0.241	0.077	0.418	0.251	0.868	0.806	0.253	0.454	0.348
Month FE	No	No	No	No	Yes	No	No	No	No
Food controls	No	No	No	No	No	Yes	No	No	Yes
Occup. controls	No	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: hypertension. Standard errors in parentheses. Logit regression. Blood pressure controls, Individual controls and State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table B.2 shows all control variables. *p<0.1, **p<0.05, ***p<0.01.

changes in food consumption could explain part of the general increase in hypertension in the post-demonetization period. In addition, controlling for food consumption may amplify the demonetization exposure effect depicted in the interaction term. As the significance remains at the same level, nutrition is not the only transmission mechanism for the effects. Other robustness checks make the results insignificant, however, the sign remains positive. I am not concerned about occupational controls in Column (7) because the number of observations is drastically smaller, but covariate shocks and geographic characteristics in Columns (5) and (8) could be driving my main effects. According to the overall goodness-of-fit p-values, only Column (2) has a lack of fit.[26] Collectively the results of all columns suggest that, after the demonetization, overall and intensified in more severely affected regions, the chance of suffering from hypertension was higher. To determine which blood pressure value drives the effects, I individually examine systolic and diastolic blood pressure. For those regressions, I additionally assume that the prescription of anti-hypertensive drugs was given before the demonetization.

Table 3 gives the OLS results for average systolic blood pressure. In Column (1), Post

[26]For the used goodness-of-fit tests, the null hypothesis is that the model fits the data well.

Table 3: Results: Systolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.022***	0.027***	0.026***	0.042***	-0.003	0.021***	0.013*	0.009*	-0.001
	(0.006)	(0.007)	(0.010)	(0.013)	(0.008)	(0.006)	(0.007)	(0.005)	(0.007)
Post×Dem.	0.002	-0.008	0.074	0.079	-0.002	0.002	-0.020	-0.022	-0.043
	(0.022)	(0.034)	(0.050)	(0.051)	(0.022)	(0.022)	(0.041)	(0.022)	(0.044)
Post×Poor		-0.012							
		(0.009)							
Post×Poor×Dem.		0.008							
		(0.040)							
Post×Phone			-0.005						
			(0.011)						
Post×Phone×Dem.			-0.079						
			(0.057)						
Post×Bank				-0.021					
				(0.013)					
Post×Bank×Dem.				-0.084					
				(0.056)					
Observations	69361	69361	69361	69293	69361	69361	23121	69049	23062
Mean dep. var.	4.759	4.759	4.759	4.759	4.759	4.759	4.774	4.759	4.774
R^2	0.189	0.189	0.189	0.189	0.193	0.189	0.198	0.194	0.205
Month FE	No	No	No	No	Yes	No	No	No	No
Food controls	No	No	No	No	No	Yes	No	No	Yes
Occup. controls	No	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: ln(systolic blood pressure). Standard errors in parentheses. Blood pressure controls, Individual controls and State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Table B.3 shows all control variables. *p<0.1, **p<0.05, ***p<0.01.

is highly significant and Post×Dem. insignificant, which tells us that after the demonetization persons under study had a 0.022 percent higher systolic blood pressure. However, differences of treatment groups are indistinguishable. Food controls in Column (6) cannot explain the relationship, but make the coefficient slightly smaller. Occupational and geospatial controls in Columns (7) and (8) separately lower the coefficient even more and increase the standard errors to a 10%-level. A combination of all controls in Column (9) and month-fixed effects in Column (5) make the results insignificant. None of my three determinants were of relevance.

Table 4 gives the OLS results for average diastolic blood pressure. For my main specification in Column (1) after the demonetization, a one percent higher exposure significantly increased diastolic blood pressure by 0.065 percent. Generally, it significantly increased by 0.016 percent. For all respondents, having a bank account significantly reduced the impact by 0.031 percent. Notice the almost doubling of Post×Dem. and the almost tripling of Post in Column (4). The results are robust against food controls in Column (6). Other controls make the results insignificant. But even with month-fixed effects in Column (5), there is a significant exposure effect.

Table 4: Results: Diastolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.016**	0.013	0.028***	0.045***	0.009	0.016**	0.008	0.005	-0.002
	(0.007)	(0.010)	(0.009)	(0.015)	(0.010)	(0.007)	(0.010)	(0.007)	(0.010)
Post×Dem.	0.065**	0.065	0.053	0.113**	0.054**	0.064**	0.035	0.033	0.005
	(0.026)	(0.043)	(0.054)	(0.056)	(0.026)	(0.026)	(0.056)	(0.026)	(0.058)
Post×Poor		0.006							
		(0.011)							
Post×Poor×Dem.		0.009							
		(0.049)							
Post×Phone			-0.013						
			(0.011)						
Post×Phone×Dem.			0.012						
			(0.062)						
Post×Bank				-0.031**					
				(0.016)					
Post×Bank×Dem.				-0.049					
				(0.060)					
Observations	69361	69361	69361	69293	69361	69361	23121	69049	23062
Mean dep. var.	4.348	4.348	4.348	4.348	4.348	4.348	4.353	4.348	4.353
R^2	0.172	0.173	0.173	0.173	0.177	0.173	0.189	0.177	0.192
Month FE	No	No	No	No	Yes	No	No	No	No
Food controls	No	No	No	No	No	Yes	No	No	Yes
Occup. controls	No	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: ln(diastolic blood pressure). Standard errors in parentheses. Blood pressure controls, Individual controls and State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Table B.4 shows all control variables. *p<0.1, **p<0.05, ***p<0.01.

5.1.2 Empirical results: Glucose level

For glucose level, I include specific glucose level controls. Those are time of glucose measurement, time since ate, and time since drank non-water the last time. I assume the information about having diabetes was given before the demonetization. Because of the correlation with blood pressure, I also assume the information about high blood pressure and the prescription of anti-hypertensive drugs was given before.

Table 5 gives the OLS results for glucose level. Post-demonetization, the glucose level significantly increased by 0.021 percent, see Column (1). It is not explained by food consumption in Column (6). The result also remains significant at a 10%-level with month-fixed effects in Column (5). Other robustness checks make the coefficient insignificant and none of the determinants were important. The demonetization strength is irrelevant in all specifications.

Table 5: Results: Glucose level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.021**	0.016	0.002	0.042**	0.032*	0.020**	0.023	0.017	0.017
	(0.010)	(0.015)	(0.017)	(0.020)	(0.016)	(0.010)	(0.017)	(0.011)	(0.017)
Post×Dem.	0.008	-0.000	0.125	0.033	-0.005	0.008	-0.122	-0.006	-0.132
	(0.055)	(0.067)	(0.124)	(0.098)	(0.056)	(0.055)	(0.157)	(0.057)	(0.165)
Post×Poor		0.011							
		(0.018)							
Post×Poor×Dem.		0.034							
		(0.088)							
Post×Phone			0.020						
			(0.020)						
Post×Phone×Dem.			-0.131						
			(0.112)						
Post×Bank				-0.022					
				(0.025)					
Post×Bank×Dem.				-0.023					
				(0.099)					
Observations	75679	75679	75679	75605	75679	75679	25197	75358	25139
Mean dep. var.	4.623	4.623	4.623	4.623	4.623	4.623	4.633	4.623	4.633
R^2	0.108	0.108	0.108	0.108	0.110	0.108	0.107	0.110	0.109
Month FE	No	No	No	No	Yes	No	No	No	No
Food controls	No	No	No	No	No	Yes	No	No	Yes
Occup. controls	No	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: ln(glucose level). Standard errors in parentheses. Glucose controls, Individual controls and State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Table B.5 shows all control variables. *p<0.1, **p<0.05, ***p<0.01.

5.2 Health behavior

Next, I look at whether there have also been effects on health behaviors, if there have been any changes in tobacco or alcohol use. Due to the somewhat similar commodity structure of the two drugs, one would expect the sign to point in the same direction. However, this is not the case.

5.2.1 Empirical results: Alcohol use

Since alcohol frequency is an ordinal variable, I use an ordered logit model. Table 6 gives the results. The coefficient for Post×Dem. in Column (1) is significant. This means that post-demonetization, a one percent higher exposure increased the ordered log-odds of being in a higher alcohol frequency category by 0.016 units. This corresponds to an increase in the proportional odds of moving to a higher level of 1.587 percent. For the control group, there was no significant change. With month-fixed effects in Column (5), the change in the control group becomes highly significant. Even with geospatial controls in Column (7), both coefficients remain at a 10% significance level. Both indicate that survey time and area mattered. Having a mobile phone or bank account increased the

Table 6: Results: Frequency drinks alcohol

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.081	-0.046	-0.513	-0.533	1.054***	-0.163	0.339*	0.148
	(0.190)	(0.268)	(0.358)	(0.407)	(0.256)	(0.204)	(0.189)	(0.206)
Post×Dem.	1.582**	0.838	2.010	0.940	1.503**	0.907	1.476*	0.106
	(0.739)	(0.860)	(1.484)	(1.327)	(0.725)	(0.832)	(0.803)	(1.053)
Post×Poor		0.190						
		(0.339)						
Post×Poor×Dem.		1.419						
		(1.172)						
Post×Phone			0.694*					
			(0.364)					
Post×Phone×Dem.			-0.495					
			(1.510)					
Post×Bank				0.680*				
				(0.351)				
Post×Bank×Dem.				0.645				
				(1.267)				
Observations	76720	76720	76720	76644	76683	25501	76392	25442
Mean dep. var.	0.188	0.188	0.188	0.188	0.188	0.295	0.188	0.294
MZ-R^2	0.479	0.478	0.479	0.479	0.489	0.528	0.500	0.559
Month FE	No	No	No	No	Yes	No	No	No
Occup. controls	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: frequency drinks alcohol. Standard errors in parentheses. Ordered Logit regression. Individual controls and State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. In (5) January FE is omitted because it predicts perfectly (44 observations omitted). MZ-R^2 according to McKelvey and Zavoina (1975) without sample weights, clusters and strata. Stata©/SE 17.0's maximum number of variables was reached with *ologitgof* (Fagerland & Hosmer, 2017). Table B.6 shows all control variables and additional R^2. *p<0.1, **p<0.05, ***p<0.01.

ordered odds roughly the same. The coefficients in Columns (3) and (4) are significant at a 10%-level, and Post and Post×Dem are no longer significant. Hence, access to those tools can explain more of the increase than the exposure.

5.2.2 Empirical results: Tobacco use

The logit results for tobacco use are given in Table 7. Unlike the first graphical evaluation (Figure 3a), in Column (1) the coefficient for Post×Dem is significantly negative and the change of the control group is insignificant. Post-demonetization, a one percent higher exposure decreased the odds of using any kind of tobacco by 1.869 percent. The coefficient is robust against month-fixed effects in Column (5) and becomes highly significant with the inclusion of geospatial controls in Column (7). Job characteristics in Column (6) seem to play a role. They make the coefficient for Post significantly positive and Post×Dem. insignificant. Column (3) records a significant increase in the odds of using tobacco for having a mobile phone post-demonetization. Post×Dem. becoming highly significant

Table 7: Results: Tobacco use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.138	0.355	-0.502*	-0.038	-0.015	0.394**	0.020	0.244
	(0.158)	(0.253)	(0.288)	(0.344)	(0.247)	(0.200)	(0.163)	(0.206)
Post×Dem.	-1.896**	-1.381	-4.249***	-2.913**	-1.836**	-0.605	-2.355***	-0.592
	(0.770)	(1.359)	(1.438)	(1.269)	(0.745)	(1.242)	(0.848)	(1.439)
Post×Poor		-0.412						
		(0.279)						
Post×Poor×Dem.		-1.000						
		(1.345)						
Post×Phone			0.710**					
			(0.338)					
Post×Phone×Dem.			2.628					
			(1.656)					
Post×Bank				0.192				
				(0.379)				
Post×Bank×Dem.				1.173				
				(1.396)				
Observations	76720	76720	76720	76644	76720	25501	76392	25442
Mean dep. var.	0.132	0.132	0.132	0.132	0.132	0.246	0.132	0.246
p-value	3×10^{-61}	1×10^{-65}	3×10^{-59}	2×10^{-58}	2×10^{-50}	3×10^{-11}	1×10^{-78}	6×10^{-9}
Month FE	No	No	No	No	Yes	No	No	No
Occup. controls	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: tobacco use. Standard errors in parentheses. Logit regression. Individual controls and State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table B.7 shows all control variables. *p<0.1, **p<0.05, ***p<0.01.

and Post significant shows that having a phone was indeed an important determinant in the months after the shock. The low overall goodness-of-fit p-values indicate a poor fit of the models and suggest a redesign. More research is needed since the Archer and Lemeshow (2006) test does not indicate in which respect the model should be changed. Nevertheless, the interpretation of the coefficients doesn't change with a poor model fit.

5.3 Health system characteristics

The last aspect I look at is the change in healthcare accessibility for females. On the one hand, the collective question is whether a woman had at least one problem in accessing healthcare. On the other hand, the specific question is whether money was the problem. The findings reveal that women actually faced more problems.

5.3.1 Empirical results: Problems accessing healthcare

Table 8 reports the logit results for all problems accessing healthcare. In contrast to the reduction in Figure 3a, in Column (1) the strength of the demonetization is highly significantly positive and the effect on the control group is insignificant. For women

Table 8: Results: Problems accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	-0.141	-0.228	-0.455	-0.048	0.099	-0.325	-0.219	-0.388
	(0.179)	(0.223)	(0.442)	(0.464)	(0.277)	(0.277)	(0.190)	(0.288)
Post×Dem.	4.171***	4.054***	4.235**	4.553***	4.255***	1.063	3.178***	0.753
	(0.937)	(1.290)	(1.684)	(1.710)	(0.958)	(2.481)	(0.918)	(1.969)
Post×Poor		0.297						
		(0.283)						
Post×Poor×Dem.		0.224						
		(1.326)						
Post×Phone			0.333					
			(0.442)					
Post×Phone×Dem.			-0.090					
			(1.729)					
Post×Bank				-0.097				
				(0.502)				
Post×Bank×Dem.				-0.430				
				(1.739)				
Observations	65057	65057	65057	64985	65057	13838	64763	13813
Mean dep. var.	0.841	0.841	0.841	0.840	0.841	0.840	0.840	0.839
p-value	0.436	0.376	0.643	0.480	0.549	0.177	0.940	0.998
Month FE	No	No	No	No	Yes	No	No	No
Occup. controls	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: problems accessing health care. Standard errors in parentheses. Logit regression. Individual controls and State FE are included. DHS national women sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table B.8 shows all control variables. *p<0.1, **p<0.05, ***p<0.01.

surveyed, a one percent higher exposure increased the odds of having at least one problem in accessing healthcare by 4.238 percent. This is resistant to all robustness tests, except for occupation in Column (7). None of the three determinants mattered significantly. At this point, I would like to find out if the answer that money is the problem drives this effect.

5.3.2 Empirical results: Money as problem accessing healthcare

See Table 9 for the logit results of money as the problem for not having access to healthcare. In Column (1), the change for the control group is insignificant and Post×Dem. is significantly positive at a 10%-level. Post-demonetization, a one percent higher exposure increased the odds of reporting money as the problem in accessing healthcare by 1.557 percent. The result is only robust against geospatial controls in Column (7). Rather counterintuitive, in Column (3), women with a mobile phone significantly faced higher odds of reporting this problem. The demonetization exposure becomes irrelevant in this setting. It could be that those who had a mobile phone were more aware of the demonetization and their money, and therefore reported the problem. However, this is

Table 9: Results: Money as problem accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.219	0.236	-0.559*	-0.195	0.274	0.169	0.146	0.135
	(0.149)	(0.209)	(0.320)	(0.446)	(0.269)	(0.237)	(0.158)	(0.256)
Post×Dem.	1.553*	2.924**	-0.105	0.305	1.314	-1.533	1.425*	-1.604
	(0.803)	(1.466)	(1.334)	(1.434)	(0.818)	(0.995)	(0.829)	(1.045)
Post×Poor		-0.013						
		(0.268)						
Post×Poor×Dem.		-2.001						
		(1.583)						
Post×Phone			0.855**					
			(0.341)					
Post×Phone×Dem.			1.819					
			(1.367)					
Post×Bank				0.443				
				(0.428)				
Post×Bank×Dem.				1.310				
				(1.299)				
Observations	65057	65057	65057	64985	65057	13838	64763	13813
Mean dep. var.	0.339	0.339	0.339	0.339	0.339	0.323	0.339	0.322
p-value	0.136	0.142	0.147	0.160	0.791	0.909	0.240	0.991
Month FE	No	No	No	No	Yes	No	No	No
Occup. controls	No	No	No	No	No	Yes	No	Yes
Geosp. controls	No	No	No	No	No	No	Yes	Yes

Notes: Dependent variable: money as problem accessing health care. Standard errors in parentheses. Logit regression. Individual controls and State FE are included. DHS national women sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table B.9 shows all control variables. *p<0.1, **p<0.05, ***p<0.01.

purely a conjecture. Altogether, it appears that other issues are driving the aggregated effect of having more problems in accessing healthcare after the demonetization. Some of the problems are indirectly dependent on the availability of money such as obtaining permission or transport. For example, in line with this idea, Karmakar and Narayanan (2020) found a transport expenditure reduction.

5.4 Empirical results: Summary

In summary, I find causal effects of India's demonetization on health conditions, health behavior, and health system characteristics. I also identify two factors that played a role or were helpful in the months after the shock.

First, compared to the increase in the control group, a one percent higher exposure increased the odds of having hypertension by 1.010 percent at a 10% significance level. The main determinant for hypertension is diastolic blood pressure. A one percent higher exposure significantly increased diastolic blood pressure by 0.065 percent. As the result is robust against food controls and month-fixed effects, nutrition levels and covariate shocks cannot explain all of the effects. Occupational controls make the results insignificant in all of my regressions. Either it indicates a sufficient explanation of the relationship, or the reduction in observations makes the study size too small. Given that the drop is approximately half overall and one-third for post-observations, I rather suspect the latter. This is corroborated by the mostly insignificant coefficients of the occupational controls, with the exception of health behaviors. Insignificant results are also obtained by robustness testing with geospatial controls. However, those are less supported by medical considerations compared to individual controls. Therefore, it might be that the standard errors just increase because of the inclusion of irrelevant variables. Systolic blood pressure and blood glucose significantly increased post-demonetization, but the treatment effect is insignificant.

Second, the impact on substance use patterns is ambiguous. On the one hand, a one percent higher exposure significantly increased the proportional odds of alcohol frequency levels by 1.587 percent. On the other hand, it significantly decreased the odds of tobacco consumption by 1.869 percent. In terms of the mechanisms of De Goeij et al. (2015), psychological distress predominated in the case of alcohol, while in the case of tobacco, the tighter budget constraint prevailed. I call this disparity frustration drinking. In economically bad times, people tend to reach for a glass rather than a cigarette or another type of tobacco. The results are robust against month-fixed effects. Tobacco use is additionally robust against detailed geospatial controls.

Third, a one percent higher exposure highly significantly increased the odds of having problems in accessing healthcare by 4.238 percent, whereas less money available was not directly the main problem. The result is robust against month-fixed effects and geospatial controls.

Finally, having a bank account or a mobile phone played a role in the severity of those impacts, with the caveat that the relevance was general and did not manifest at higher levels of exposure. This conclusion relies on the strong assumption of no other shocks and policies. The possession of a bank account significantly mitigated hypertension and intensified alcohol consumption at a 10% significance level. The findings are in line with Karmakar and Narayanan (2020), who find that bank accounts systematically helped during the demonetization. Having a mobile phone additionally intensified alcohol consumption at 10% significance and significantly attenuated declines in tobacco consumption. Interestingly, it significantly reinforced money as the problem of not having access to the healthcare system. This result is in contrast to Joshi (2022), who found no impact of mobile phones. Being poor did not play a role in all of my regressions. Note that the literature on wealth in relation to the demonetization is divided. Some find proportionately positive effects on income and expenditure, while others observed negative effects on health.

6 Conclusion

Health is essential for our society but is given limited consideration in monetary macroeconomics. To shed light on this topic, I drew on the unique 2016 event of demonetization in India. Using bank branch information and individual-level health survey data, I utilized the geographic heterogeneity of the random liquidity shock. By comparing respondents before and after the demonetization, I am able to reject my first three hypotheses and partially reject the last. I find significant short-term effects for higher-exposure groups in health conditions, health behavior, and health system characteristics namely, higher diastolic blood pressure, more alcohol consumption, lower tobacco consumption, and more problems in accessing healthcare. Apart from tobacco, these effects correspond to increased health risks. I could not find significant treatment effects for hypertension, systolic blood pressure, glucose level and money as the healthcare access problem. Since the control group was also substantially affected by the demonetization, their change is of interest. However, the interpretation must take the strong assumption of no other policies and economic shocks into account. In this regard, I found significantly increased levels of diastolic and systolic blood pressure and blood glucose. Furthermore, I examined the importance of three factors in coping with the shock. In this sense, a mobile phone and a bank account were important compared to wealth. However, for higher exposure groups, the importance was indistinguishable. To guide my analysis, I built a general equilibrium demonetization model with health in the Cobb-Douglas composite of consumption. It shows a decrease in health driven by a decrease in health consumption overall and intensified in higher exposure regions.

My results should raise awareness about causal impacts that monetary policy can have on health. By understanding the various dimensions of this link, future monetary policy could use it for the positive. Bank accounts and mobile phones are two examples that tend to make society more resilient against these shocks, which speaks in favor of a digitized banking system. More research is needed to substantiate my findings. One could look at other health variables and coping factors or at long-term effects. However, it would be most important to validate the results with other monetary shocks in different countries, preferably with a panel dataset. It is not yet clear to what extent the results from India can be transferred to other settings. For the model, endogenous technology adaptation, health in the utility function and dynamics could be the next stages of development.

7 Supplementary material

Model proofs and additional tables and figures can be found in the Appendix. Publicly available data can be downloaded from the RBI Database on Indian Economy and the DHS website under request. Currency chest data from the RBI is non-public. Replication codes are available on request.

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APPENDIX for "Health impacts of a monetary policy shock: Evidence from India's 2016 demonetization"

A Model proofs

A.1 Household's first order conditions

First-order conditions (FOCs) for the household are:

$$C_{i,t}: \quad U'(C_{i,t}) = (\lambda_{i,t} + \kappa\theta_{i,t})P_{i,t}), \tag{A.1}$$

$$M_{i,t}: \quad \lambda_{i,t}(1 + \tau'(\eta_{i,t})) = \beta(\lambda_{i,t+1} + \theta_{i,t+1}), \tag{A.2}$$

$$D_{i,t}: \quad \lambda_{i,t} = \beta R_t \lambda_{i,t+1}, \tag{A.3}$$

$$C^T_{i,t}: \quad P^T_t C^T_{i,t} = \alpha_1 P_{i,t} C_{i,t}, \tag{A.4}$$

$$C^N_{i,t}: \quad P^N_{i,t} C^N_{i,t} = \alpha_2 P_{i,t} C_{i,t}, \tag{A.5}$$

$$C^H_{i,t}: \quad P^H_{i,t} C^H_{i,t} = \alpha_3 \rho P_{i,t} C_{i,t}, \tag{A.6}$$

$$C^T_{i,t}(\omega): \quad C^T_{i,t}(\omega) = \left(\frac{P^T_t(\omega)}{P^T_t}\right)^{-\sigma} C^T_{i,t}, \tag{A.7}$$

The complementary slackness condition is:

$$\theta_{i,t}\left(\kappa P_{i,t} C_{i,t} - M_{i,t-1} - T^M_{i,t}\right) = 0 \tag{A.8}$$

The Lagrange multipliers are $\lambda_{i,t}$ for the budget constraint Equation (1), and $\theta_{i,t}$ for the CIA constraint Equation (2). For the effective labor income tax rate, I use the functional form $\tau(\eta_{i,t}) = \frac{\bar{\tau}}{e^{\nu\eta_{i,t}}}$ with $0 < \nu < 1$.

A.2 Proof: Proposition 1

Before the shock in period -1, the economy is in a zero inflation steady state with $M^s = M_{-1}$. Because of tax evasion incentives, assume that in period -1 the CIA constraint does not bind $M_{-1} > \kappa P_{-1} C_{-1}$, which can be expressed as $\theta_{-1} = 0$. Also assume that, in period 0, the CIA constraint $M_0 = \bar{\kappa} P_0 C_0$ and the wage constraint $W_0 = \gamma W_{-1}$ bind. The CIA constraint not binding in period 0 can be written as $\theta_0 > 0$. Later, I will derive the necessary parameter restrictions for the assumptions to hold. From (A.2) and $\tau'(\eta_{i,t}) = -\bar{\tau}\nu e^{\nu\eta_{i,t}}$ we have:

$$\eta_{-1} = \frac{1}{\nu}\ln\left(\frac{\nu\bar{\tau}}{1-\beta}\right) \tag{A.9}$$

Combined with (A.3), this gives nominal wages.

$$W_{-1} = \frac{M_{-1}}{N_{-1}\eta_{-1}} \tag{A.10}$$

In a steady state with zero inflation, (A.1) implies that real consumption is constant. Therefore, labor is constant, which implies that wages are constant and the downward nominal rigidity does not bind. Consequently, the economy is in full employment $N_{-1} = \bar{N}$. Combining η_{-1}, (A.3) and the firms' optimality condition gives the nominal prices.

$$P^T_{-1} = P^N_{-1} = P^H_{-1} = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)\frac{M_{-1}}{\bar{N}\eta_{-1}} \tag{A.11}$$

As prices are the same for all goods, using (A.4), (A.5), and (A.6) gives:

$$\frac{C^N_{-1}}{C^T_{-1}} = \frac{\alpha_2}{\alpha_1}, \qquad \frac{C^N_{-1}}{C^H_{-1}} = \frac{\alpha_2}{\alpha_3\rho}, \qquad \frac{C^T_{-1}}{C^H_{-1}} = \frac{\alpha_1}{\alpha_3\rho}$$

Applying market clearing conditions

$$C^T_{-1} = N^T_{-1}, \qquad C^N_{-1} = N^N_{-1}, \qquad C^H_{-1} = N^H_{-1}, \qquad N^T_{-1} + N^N_{-1} + N^H_{-1} = \bar{N} \tag{A.12}$$

gives:

$$N^T_{-1} = \frac{\alpha_1\bar{N}}{1-(1-\rho)\alpha_3}, \qquad N^N_{-1} = \frac{\alpha_2\bar{N}}{1-(1-\rho)\alpha_3}, \qquad N^H_{-1} = \frac{\alpha_3\rho\bar{N}}{1-(1-\rho)\alpha_3}$$

In full employment, a fraction $\frac{\alpha_1}{1-(1-\rho)\alpha_3}$ works in the traded, a fraction $\frac{\alpha_2}{1-(1-\rho)\alpha_3}$ works in the non-traded, and a fraction $\frac{\alpha_3}{1-(1-\rho)\alpha_3}$ works in the health sector.
The optimal price of health goods from (A.11) multiplied by $N^H_{-1} = \frac{\alpha_3\rho\bar{N}}{1-(1-\rho)\alpha_3}$ is:

$$P_{-1}C_{-1} = \frac{\alpha_3\rho\bar{N}}{1-(1-\rho)\alpha_3}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)\frac{M_{-1}}{\bar{N}\eta_{-1}}$$

By using (A.6), we get real money balances.

$$\frac{M_{-1}}{P_{-1}} = \frac{(1-(1-\rho)\alpha_3)\eta_{-1}C_{-1}}{1 + \varphi\left(\frac{1}{\beta} - 1\right)} \tag{A.13}$$

They decrease in the interest rate R_{-1} and increase with consumption C_{-1} and the labor income tax $\bar{\tau}$.
Use the binding wage constraint (at $t = 0$) and the firms' optimality condition to arrive at:

$$P_0 = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)\gamma W_{-1}$$

Combined with (A.10), the binding CIA constraint (at $t = 0$), the definition of Z and $Y_t = C_t = N_t$, this yields the output decline:

$$\frac{Y_0}{Y_{-1}} = \frac{Z}{\gamma}\frac{\eta_{-1}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)} \tag{A.14}$$

Use the binding wage constraint (at $t = 0$) and the firms' optimality condition of health goods to get:

$$P_0^H = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)\gamma\frac{M_{-1}}{\eta_{-1}\bar{N}}$$

Multiplying by N_0^H, and using the definition of Z and the binding CIA constraint gives:

$$N_0^H = \frac{\alpha_3\rho Z}{\gamma}\frac{\eta_{-1}\bar{N}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)}$$

With $H_t = (C_t^H)^\rho$, we arrive at Equation (4) from Proposition 1 in Section 2.

$$\frac{H_0}{H_{-1}} = \left[\frac{Z}{\gamma}\frac{(1 - (1-\rho)\alpha_3)\eta_{-1}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)}\right]^\rho$$

For the shadow interest rate $R_t = \frac{1}{1-\nu\bar{\tau}(\eta_{i,t})}$, combine $R_t = \frac{\lambda_{i,t}}{\beta\lambda_{i,t+1}}$ from (A.3) with (A.2) and (A.9).

For the assumptions from the beginning to be valid I now find the corresponding parameter restrictions.
First, $\theta_{-1} = 0$. Rewriting (A.13) for $t = -1$ gives:

$$P_{-1}C_{-1} = \frac{1 + \varphi\left(\frac{1}{\beta} - 1\right)}{1 - (1-\rho)\alpha_3}\frac{M_{-1}}{\eta_{-1}}$$

The CIA constraint being slack can then be stated as:

$$\bar{\kappa}\frac{1 + \varphi\left(\frac{1}{\beta} - 1\right)}{1 - (1-\rho)\alpha_3} < \eta_{-1} = \frac{1}{\nu}\ln\left(\frac{\nu\bar{\tau}}{1-\beta}\right) \tag{A.15}$$

The tax rate $\bar{\tau}$ needs to be sufficiently large in relation to the interest rate $R_{-1} = \frac{1}{\beta}$ and the share of expenditures that must be made in cash without access to financing technology $\bar{\kappa}$. This represents the idea of tax evasion through black money before the demonetization.
Second, the downward nominal rigidity is binding in $t = 0$. Multiplying the optimality condition for non-traded goods by $C_{i,0}^N = N_0^N$ gives:

$$P_0^N C_0^N = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)N_0^N W_0$$

By using the binding CIA constraint and (A.5), we get:

$$\alpha_2\frac{M_0}{\bar{\kappa}} = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)N_0^N W_0$$

Apply the same procedure for health goods:

$$\alpha_3\rho\frac{M_0}{\bar{\kappa}} = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)N_0^H W_0$$

Because of the homogeneous demonetization, regional trade balances remain at zero. Therefore the same procedure is used for tradeable goods.

$$\alpha_1 \frac{M_0}{\bar{\kappa}} = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right) N_0^T W_0$$

Combining the last three equations and the labor market clearing condition from (A.12) gives:

$$W_0 = \frac{M_0}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right) N_0}$$

Under the following condition, $N_0 < \bar{N}$ and $W_0 = \gamma W_{-1}$. Use the previous equation and (A.10) to get:

$$\begin{aligned} \frac{M_0}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right) N_0} &< \gamma \frac{M_{-1}}{N_{-1}\eta_{-1}} \\ Z \frac{\eta_{-1}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)} &< \gamma \end{aligned} \tag{A.16}$$

Third, $\theta_0 > 0$. Multiply (A.1) by $C_0 \frac{\bar{\kappa}}{\bar{\kappa}}$ to get:

$$\frac{\bar{\kappa} U'(C_0) C_0}{M_0} = (\lambda_0 + \bar{\kappa}\theta_0)$$

I do not expect the CIA constraint to bind for $t > 0$. With (A.2) this gives:

$$\theta_0 = \frac{U'(C_0) C_0}{M_0} - \frac{\beta \lambda_1}{\bar{\kappa}\left(1 - \tau'(\eta_0)\right)}$$

Rewrite (A.13) for $t = 1$, and use (A.1) to get:

$$\frac{U'(C_1)}{\lambda_1} C_1 = \frac{1 + \varphi\left(\frac{1}{\beta} - 1\right)}{1 - (1 - \rho)\alpha_3} \frac{M_1}{\eta_1}$$

After rearranging, $\theta_0 > 0$ can be written as:

$$\begin{aligned} \frac{U'(C_0) C_0}{M_0} - \frac{\frac{\beta \eta_1 U'(C_1) C_1}{\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right) M_1}}{\bar{\kappa}\left(1 - \tau'(\eta_0)\right)} &> 0 \\ \frac{M_1}{M_0} &> \frac{\beta \eta_1 U'(C_1) C_1}{\bar{\kappa}\left(1 - \tau'(\eta_0)\right)\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right) U'(C_0) C_0} \end{aligned}$$

With a constant elasticity of substitution (CES) utility function, this is:

$$\frac{M_1}{M_0} > \frac{\beta \eta_1}{\bar{\kappa}\left(1 - \tau'(\eta_0)\right)\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)} \tag{A.17}$$

A.3 Proof: Proposition 2

Again, assume that in period 0, the CIA $M_{i,0} = \bar{\kappa} P_{i,0} C_{i,0}\,, \forall i$ and wage constraint $W_{i,0} = \gamma W_{-1}\,, \forall i$ bind. The parameter restriction for the assumption to hold is shown in the end. Also assume that, in period -1, the CIA constraint does not bind.[27] Use the binding wage constraint and the firms' optimality condition of non-traded and health goods in each region to get:

$$P^N_{i,0} = P^H_{i,0} = \left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)\gamma \frac{M_{-1}}{\eta_{-1}\bar{N}}$$

Multiplying by N^N_0, and using the definition of Z_i and the binding CIA constraint yields:

$$N^N_{i,0} = \frac{\alpha_2 Z_i}{\gamma} \frac{\eta_{-1}\bar{N}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)}$$

Similarly, multiplying by N^H_0 gives:

$$N^H_{i,0} = \frac{\alpha_3 \rho Z_i}{\gamma} \frac{\eta_{-1}\bar{N}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)}$$

As wages are constant across regions, tradeable prices are constant $C^T_{j,0}(i) = C^T_{j,0}$. Use the binding wage constraint, the firms' optimality condition of traded goods, the definition of Z_i and the binding CIA constraint to get:

$$N^T_{j,0}(i) = \frac{\alpha_1 Z_{j,0}}{\gamma} \frac{\eta_{-1}\bar{N}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)}$$

Integrating over j on both sides gives:

$$N^T_{i,0} = \frac{\alpha_1 Z}{\gamma} \frac{\eta_{-1}\bar{N}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)}$$

Using the terms for $N^T_{i,0}$, $N^N_{i,0}$, and $N^H_{i,0}$ just derived and the production function in (A.12), we have the output drop.

$$\frac{Y_{i,0}}{Y_{i,-1}} = \frac{Y^T_{j,0}(i) + Y^N_{i,0} + Y^H_{i,0}}{Y_{i,-1}} = \frac{\alpha_1 Z + (\alpha_2 + \alpha_3) Z_i}{\gamma} \frac{\eta_{-1}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)} \tag{A.18}$$

With the term for $N^H_{i,0}$ just derived, N^H_{-1} from (A.12), and $H_t = (C^H_t)^\rho$, we arrive at Equation (5) from Proposition 2 in Section 2.

$$\frac{H_{i,0}}{H_{i,-1}} = \left[\frac{Z_i}{\gamma} \frac{(1 - (1-\rho)\alpha_3)\eta_{-1}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)}\right]^\rho$$

By assuming no government redistribution, the change in savings can be written as $D_{j,1} - D_0 = \left(Y^T_0(\omega) - C^T_{j,0}(\omega)\right) + (R_0 - 1)D_0$. Regional trade balances are $\left(Y^T_0(\omega) - Y^T_{j,0}(\omega)\right)$

[27] Same parameter restriction (A.17) as in Proposition 1.

and $(R_0 - 1)D_0$ are the interest earnings on last period's deposits.[28] Since $Y_0^T(\omega)$ is the same across regions and $C_{j,0}^T(\omega)$ varies, regions with a higher shock exposure run trade balance deficits in period 0. Therefore, high Z_i regions permanently have lower financial wealth and consumption by the amount of deposit interest earnings $(\frac{1}{\beta} - 1)D_{j,1}$.[29]

I now derive the conditions under which the assumptions from the beginning hold.
First, the downward nominal rigidity is binding in $t = 0$. Similar to Proposition 1, $N_{i,0} < \bar{N}$ and $W_{i,0} = \gamma W_{-1}$ for:

$$(\alpha_1 Z + (\alpha_2 + \alpha_3)\tilde{Z})\frac{\eta_{-1}}{\bar{\kappa}\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)} < \gamma \tag{A.19}$$

Where $\tilde{Z} = \max_j Z_j$.
Second, $\theta_{i,0} > 0$. Similar to Proposition 1:

$$\frac{M_1}{M_{i,0}} > \frac{\beta\eta_1}{\bar{\kappa}\left(1 - \tau'(\eta_0)\right)\left(1 + \varphi\left(\frac{1}{\beta} - 1\right)\right)} \tag{A.20}$$

[28] The lump-sum transfer of each region just equals their labor income tax and money infusions.
[29] Alternatively, the government could redistribute the gains via lump-sum transfers. Chodorow-Reich et al. (2020) write that it would have no meaningful impact on the solutions for period 0.

B Additional Tables and Figures

B.1 Additional Figures

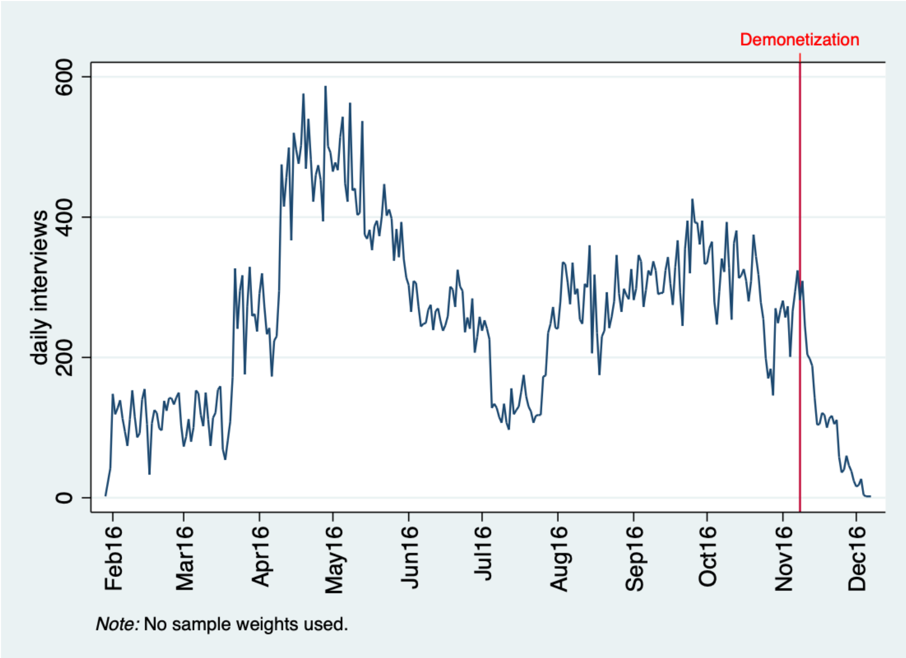


Figure B.1: Timeline of interviews per day

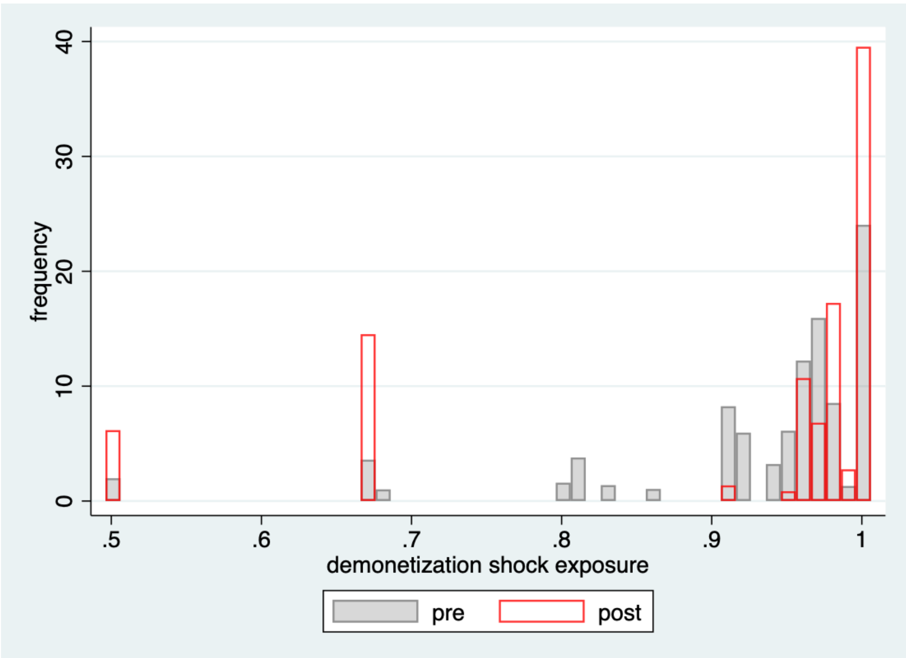
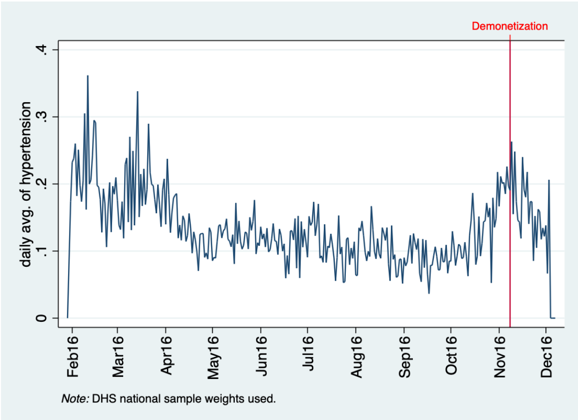
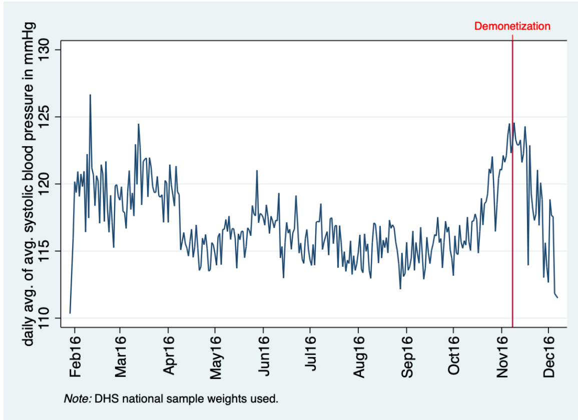


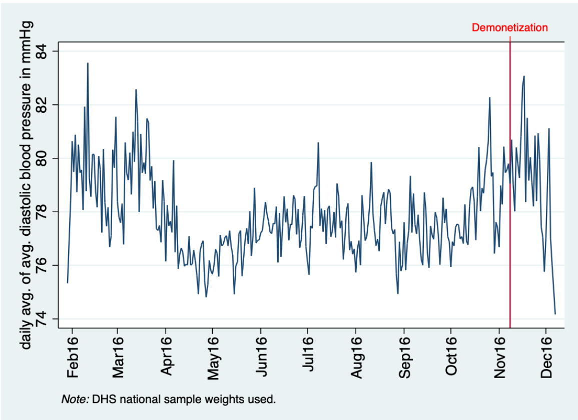
Figure B.2: Histogram: Demonetization shock exposure



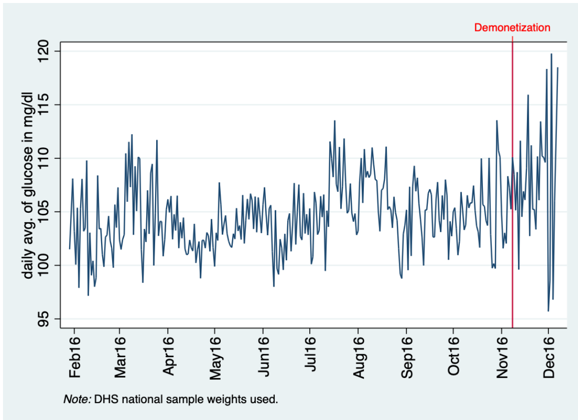
(a) Hypertension



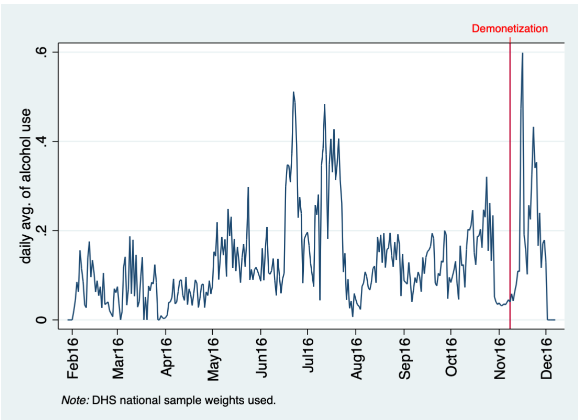
(b) Avg. systolic bp in mmHg



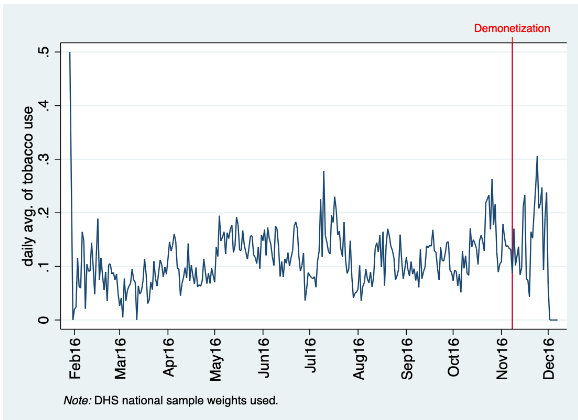
(c) Avg. diastolic bp in mmHg



(d) Glucose in mg/dl

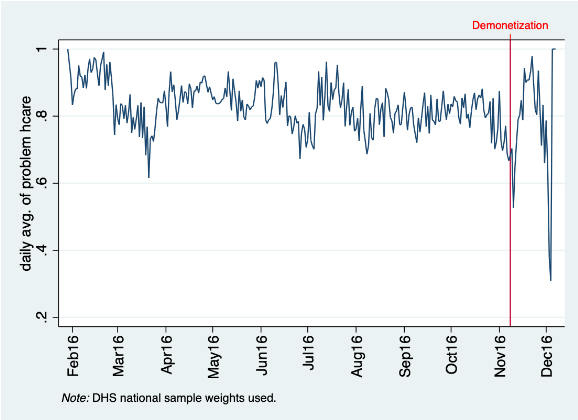


(e) Frequ. drinks alcohol

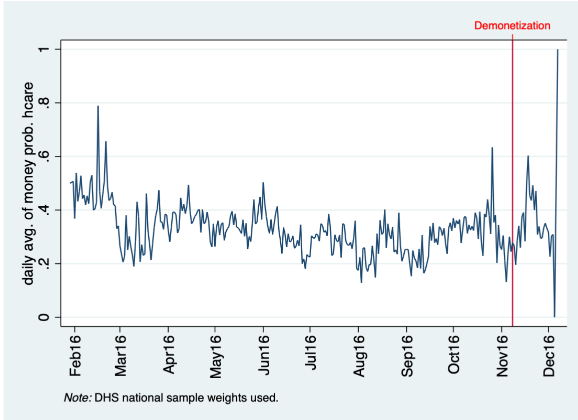


(f) Uses tobacco

Figure B.3: Timeline of the daily average of dependent variables



(g) Problem healthcare



(h) Money problem healthcare

Figure B.3: (Continued) Timeline of the daily average of dependent variables

B.2 Full summary statistics

Table B.1: Summary statistics: Covariates

	Mean	Std.dev.	Min	P10	Median	P90	Max	Count
Pre								
Individual controls								
Man	0.15	0.36	0.00	0.00	0.00	1.00	1.00	76429
BMI	21.87	4.72	12.02	17.48	21.25	26.82	99.98	74925
Age	29.83	9.85	15.00	17.00	29.00	45.00	54.00	76429
Diabetes	0.15	1.04	0.00	0.00	0.00	0.00	8.00	76429
Education	2.17	1.71	0.00	0.00	3.00	4.00	5.00	76429
Wealth status	2.68	1.35	1.00	1.00	3.00	5.00	5.00	76429
Altitude	925.31	833.78	24.00	163.00	570.00	1991.00	5020.00	75578
Bp controls								
Bp time	0.59	0.10	0.08	0.46	0.59	0.71	1.00	74862
Eaten 30m	0.31	0.46	0.00	0.00	0.00	1.00	1.00	74873
Coffe/tea 30m	0.23	0.42	0.00	0.00	0.00	1.00	1.00	74874
Smoked 30 m	0.04	0.19	0.00	0.00	0.00	0.00	1.00	74874
Oth. tobacco 30m	0.04	0.20	0.00	0.00	0.00	0.00	1.00	74873
Bp medicine	0.04	0.19	0.00	0.00	0.00	0.00	1.00	74831
Bp told high	0.11	0.31	0.00	0.00	0.00	1.00	1.00	74832
Arm circumference	25.07	3.16	6.00	22.00	25.00	29.00	76.00	74862
Cuffsize	1.89	0.37	1.00	1.00	2.00	2.00	3.00	74856
Glucose controls								
Glucose time	0.64	0.38	0.08	0.47	0.60	0.73	4.07	75603
Time eaten	2.82	3.32	0.00	0.00	2.00	6.00	48.00	74482
Time drank non-water	14.66	30.49	0.00	0.00	2.00	95.00	95.00	74039
Food controls								
Milk	0.51	0.50	0.00	0.00	1.00	1.00	1.00	76429
Pulses/beans	0.78	0.41	0.00	0.00	1.00	1.00	1.00	76429
Vegetables	0.87	0.34	0.00	0.00	1.00	1.00	1.00	76429
Fruits	0.38	0.49	0.00	0.00	0.00	1.00	1.00	76429
Eggs	0.39	0.49	0.00	0.00	0.00	1.00	1.00	76429
Fish	0.26	0.44	0.00	0.00	0.00	1.00	1.00	76429

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Table B.1 (*Continued*): Summary statistics: Covariates

	Mean	Std.dev.	Min	P10	Median	P90	Max	Count
Meat	0.41	0.49	0.00	0.00	0.00	1.00	1.00	76429
Fried food	0.33	0.47	0.00	0.00	0.00	1.00	1.00	76429
Aerated drinks	0.17	0.38	0.00	0.00	0.00	1.00	1.00	76429
Occupation	2.15	2.42	0.00	0.00	0.00	6.00	7.00	25500
Geospatial controls								
Population index	0.06	0.16	0.00	0.00	0.00	0.15	0.99	75385
Avg. month. temp.	21.81	7.44	-2.67	10.72	24.31	30.04	34.16	75385
Slope	4.26	4.85	0.04	0.30	1.51	12.55	18.91	75385
PPP	1951.15	368.70	666.22	1211.67	1975.51	2306.39	2630.59	75385
Nighlight	2.27	5.89	0.00	0.01	0.40	5.88	68.42	75385
Vegetation	2908.17	794.32	291.58	2260.42	2776.20	4229.73	4975.92	75385
Aridity	37.64	9.96	8.28	26.78	35.83	52.55	64.43	75385
Dist. border	123183	100923	262	17303	83443	283264	377221	75385
Dist. prot. area	34553	23961	0	6047	29866	68651	113977	75385
Dist. water	88489	47558	0	20904	89615	154319	235676	75385
Interaction variables								
Poor	0.59	0.49	0.00	0.00	1.00	1.00	1.00	76429
Phone	0.91	0.28	0.00	1.00	1.00	1.00	1.00	76429
Bank account	0.92	0.26	0.00	1.00	1.00	1.00	1.00	76351
Post								
Individual controls								
Man	0.16	0.36	0.00	0.00	0.00	1.00	1.00	2933
BMI	22.68	4.50	13.50	18.09	22.31	27.14	99.98	2900
Age	30.77	9.61	15.00	18.00	30.00	45.00	54.00	2933
Diabetes	0.24	1.31	0.00	0.00	0.00	0.00	8.00	2933
Education	2.36	1.70	0.00	0.00	3.00	5.00	5.00	2933
Wealth status	2.85	1.29	1.00	1.00	3.00	5.00	5.00	2933
Altitude	622.20	669.28	28.00	130.00	244.00	1589.00	2903.00	2861
Bp controls								
Bp time	0.57	0.10	0.12	0.44	0.57	0.70	0.89	2898
Eaten 30m	0.36	0.48	0.00	0.00	0.00	1.00	1.00	2900
Coffe/tea 30m	0.32	0.47	0.00	0.00	0.00	1.00	1.00	2899
Smoked 30 m	0.04	0.19	0.00	0.00	0.00	0.00	1.00	2899
Oth. tobacco 30m	0.09	0.29	0.00	0.00	0.00	0.00	1.00	2899
Bp medicine	0.03	0.18	0.00	0.00	0.00	0.00	1.00	2897
Bp told high	0.11	0.31	0.00	0.00	0.00	1.00	1.00	2897
Arm circumference	25.17	3.28	11.00	22.00	25.00	30.00	72.00	2899
Cuffsize	1.91	0.37	1.00	1.00	2.00	2.00	3.00	2900
Glucose controls								
Glucose time	0.60	0.24	0.14	0.45	0.58	0.72	4.07	2903
Time eaten	2.37	2.50	0.00	0.00	2.00	5.00	30.00	2890
Time drank non-water	7.54	21.61	0.00	0.00	2.00	8.00	95.00	2890
Food controls								
Milk	0.50	0.50	0.00	0.00	0.00	1.00	1.00	2933
Pulses/beans	0.75	0.43	0.00	0.00	1.00	1.00	1.00	2933
Vegetables	0.91	0.29	0.00	1.00	1.00	1.00	1.00	2933
Fruits	0.41	0.49	0.00	0.00	0.00	1.00	1.00	2933
Eggs	0.48	0.50	0.00	0.00	0.00	1.00	1.00	2933
Fish	0.47	0.50	0.00	0.00	0.00	1.00	1.00	2933
Meat	0.55	0.50	0.00	0.00	1.00	1.00	1.00	2933
Fried food	0.47	0.50	0.00	0.00	0.00	1.00	1.00	2933
Aerated drinks	0.19	0.40	0.00	0.00	0.00	1.00	1.00	2933
Occupation	2.16	2.18	0.00	0.00	2.00	5.00	7.00	989
Geospatial controls								

Continued on next page

Table B.1 (*Continued*): Summary statistics: Covariates

	Mean	Std.dev.	Min	P10	Median	P90	Max	Count
Population index	0.08	0.21	0.00	0.00	0.00	0.25	0.83	2861
Avg. month. temp.	17.12	5.00	4.35	9.38	19.90	22.01	22.71	2861
Slope	3.53	4.59	0.09	0.18	1.10	11.29	16.76	2861
PPP	2010.45	441.49	1033.67	1455.02	1975.51	2574.02	2589.92	2861
Nighlight	1.88	4.30	0.00	0.00	0.14	4.98	23.52	2861
Vegetation	3388.99	873.11	1634.00	2259.10	3611.92	4402.92	4672.00	2861
Aridity	45.76	7.11	28.00	34.78	47.83	55.04	56.90	2861
Dist. border	76900	49178	1102	23457	68624	116829	305637	2861
Dist. prot. area	25722	24329	0	3700	16169	60415	100449	2861
Dist. water	74094	41897	1197	20207	80656	127847	181161	2861
Interaction variables								
Poor	0.55	0.50	0.00	0.00	1.00	1.00	1.00	2933
Phone	0.93	0.25	0.00	1.00	1.00	1.00	1.00	2933
Bank account	0.92	0.27	0.00	1.00	1.00	1.00	1.00	2932

Note: No sample weights used.

B.3 Full regression results

Table B.2: Results: Hypertension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.243*	0.239	0.076	0.997***	0.029	0.237*	0.200	0.141	0.106
	(0.131)	(0.175)	(0.271)	(0.348)	(0.168)	(0.130)	(0.213)	(0.132)	(0.221)
Dem.	0.243	0.205	0.552	0.154	0.493	0.251	0.304	0.366	0.145
	(0.370)	(0.415)	(0.750)	(0.599)	(0.371)	(0.371)	(0.632)	(0.357)	(0.617)
Post×Dem.	1.010*	1.647	0.369	1.872	0.876	1.078*	0.540	0.949	0.635
	(0.586)	(1.431)	(1.508)	(1.289)	(0.592)	(0.592)	(1.105)	(0.584)	(1.120)
Bp controls									
Bp time	0.670***	0.670***	0.668***	0.672***	0.707***	0.673***	0.464	0.684***	0.485
	(0.169)	(0.169)	(0.170)	(0.170)	(0.168)	(0.169)	(0.290)	(0.174)	(0.299)
Eaten 30m	0.041	0.041	0.041	0.040	0.024	0.039	0.134**	0.026	0.130**
	(0.038)	(0.038)	(0.038)	(0.039)	(0.039)	(0.038)	(0.060)	(0.039)	(0.060)
Coffe/tea 30m	0.103**	0.103**	0.103**	0.104**	0.104**	0.109**	0.037	0.102**	0.043
	(0.049)	(0.049)	(0.049)	(0.049)	(0.049)	(0.049)	(0.071)	(0.049)	(0.073)
Smoked 30 m	-0.184**	-0.184**	-0.184**	-0.182**	-0.166*	-0.183**	-0.231**	-0.186**	-0.229**
	(0.089)	(0.089)	(0.089)	(0.089)	(0.089)	(0.089)	(0.107)	(0.089)	(0.106)
Oth. tobacco 30m	0.181*	0.181*	0.181*	0.181*	0.194**	0.177*	0.158	0.193**	0.169
	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.122)	(0.093)	(0.123)
Ln arm circumf.	0.531**	0.532**	0.533**	0.512**	0.592***	0.541**	0.674**	0.606***	0.765**
	(0.211)	(0.211)	(0.211)	(0.211)	(0.206)	(0.212)	(0.332)	(0.208)	(0.330)
Cuffsize									
small	0	0	0	0	0	0	0	0	0
medium	-0.196***	-0.196***	-0.195***	-0.197***	-0.203***	-0.197***	-0.210*	-0.207***	-0.219*
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)	(0.116)	(0.064)	(0.118)
large	-0.147	-0.148	-0.147	-0.143	-0.167	-0.154	-0.157	-0.172	-0.177
	(0.119)	(0.119)	(0.119)	(0.119)	(0.119)	(0.119)	(0.186)	(0.120)	(0.188)
Individual controls									
Man	0.144**	0.143**	0.145**	0.146**	0.138**	0.150**	0.173**	0.145**	0.188**
	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)	(0.085)	(0.060)	(0.086)
Age	0.061***	0.061***	0.061***	0.062***	0.061***	0.062***	0.057***	0.061***	0.056***

Continued on next page

Table B.2 (*Continued*): Results: Hypertension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Ln BMI	1.776***	1.777***	1.778***	1.788***	1.765***	1.770***	1.830***	1.756***	1.784***
	(0.114)	(0.115)	(0.115)	(0.115)	(0.113)	(0.115)	(0.193)	(0.114)	(0.190)
Education									
no	0	0	0	0	0	0	0	0	0
incomp. prim.	0.012	0.012	0.014	0.014	0.006	0.013	0.181	0.009	0.169
	(0.076)	(0.076)	(0.076)	(0.076)	(0.076)	(0.076)	(0.142)	(0.076)	(0.142)
comp. prim.	-0.051	-0.051	-0.048	-0.052	-0.051	-0.047	-0.064	-0.051	-0.061
	(0.079)	(0.079)	(0.079)	(0.079)	(0.079)	(0.079)	(0.143)	(0.079)	(0.144)
incomp. sec.	-0.120***	-0.120***	-0.117***	-0.120***	-0.123***	-0.115***	-0.018	-0.123***	-0.018
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.080)	(0.043)	(0.081)
comp. sec.	-0.230***	-0.230***	-0.227***	-0.231***	-0.235***	-0.222***	-0.020	-0.230***	-0.014
	(0.071)	(0.071)	(0.071)	(0.071)	(0.072)	(0.072)	(0.111)	(0.072)	(0.112)
higher	-0.247***	-0.247***	-0.245***	-0.247***	-0.244***	-0.237***	0.022	-0.240***	0.042
	(0.073)	(0.073)	(0.073)	(0.073)	(0.073)	(0.074)	(0.128)	(0.073)	(0.129)
Urban	-0.026	-0.025	-0.027	-0.028	-0.012	-0.030	-0.037		
	(0.053)	(0.053)	(0.053)	(0.053)	(0.054)	(0.053)	(0.094)		
Ln altitude	-0.029	-0.028	-0.029	-0.026	0.038	-0.026	-0.025	-0.029	-0.041
	(0.028)	(0.028)	(0.028)	(0.028)	(0.030)	(0.028)	(0.048)	(0.031)	(0.053)
Drinks alcohol									
no	0	0	0	0	0	0	0	0	0
<1/week	0.359***	0.359***	0.356***	0.355***	0.350***	0.347***	0.373***	0.362***	0.380***
	(0.098)	(0.098)	(0.098)	(0.098)	(0.098)	(0.098)	(0.116)	(0.098)	(0.116)
∼1/week	0.459***	0.459***	0.455***	0.460***	0.454***	0.445***	0.434***	0.471***	0.446***
	(0.087)	(0.087)	(0.087)	(0.087)	(0.088)	(0.087)	(0.117)	(0.088)	(0.120)
>1/day	0.645***	0.645***	0.639***	0.644***	0.642***	0.622***	0.498***	0.647***	0.501***
	(0.121)	(0.122)	(0.120)	(0.121)	(0.122)	(0.122)	(0.174)	(0.122)	(0.176)
Uses tobacco	0.050	0.049	0.048	0.049	0.056	0.042	0.041	0.044	0.028
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.059)	(0.079)	(0.059)	(0.079)
Diabetes									
no	0	0	0	0	0	0	0	0	0
yes	0.246**	0.247**	0.247**	0.239**	0.243**	0.235**	-0.079	0.252**	-0.078
	(0.103)	(0.103)	(0.103)	(0.103)	(0.103)	(0.103)	(0.146)	(0.103)	(0.147)
don't know	0.078	0.078	0.078	0.079	0.051	0.075	-0.244	0.074	-0.253
	(0.155)	(0.155)	(0.154)	(0.155)	(0.155)	(0.154)	(0.257)	(0.153)	(0.254)
Bp told high	1.357***	1.357***	1.358***	1.357***	1.352***	1.355***	1.382***	1.352***	1.394***
	(0.049)	(0.049)	(0.049)	(0.049)	(0.048)	(0.049)	(0.083)	(0.048)	(0.081)
Wealth status									
poorest	0	0	0	0	0	0	0	0	0
poorer	-0.064	-0.065	-0.053	-0.058	-0.053	-0.055	0.028	-0.046	0.067
	(0.050)	(0.050)	(0.051)	(0.051)	(0.050)	(0.051)	(0.095)	(0.050)	(0.095)
middle	-0.159***	-0.151**	-0.146**	-0.150***	-0.138**	-0.147***	-0.137	-0.140**	-0.086
	(0.055)	(0.069)	(0.057)	(0.056)	(0.056)	(0.056)	(0.097)	(0.055)	(0.095)
richer	-0.180***	-0.162*	-0.167***	-0.173***	-0.171***	-0.162**	-0.227**	-0.160**	-0.170
	(0.062)	(0.095)	(0.064)	(0.063)	(0.063)	(0.063)	(0.110)	(0.065)	(0.112)
richest	-0.184**	-0.167	-0.172**	-0.175**	-0.182**	-0.157*	-0.166	-0.169**	-0.104
	(0.078)	(0.104)	(0.080)	(0.079)	(0.078)	(0.081)	(0.144)	(0.080)	(0.145)
Poor		0.020							
		(0.077)							
Post×Poor		0.024							
		(0.234)							
Poor×Dem.		0.053							

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Table B.2 (*Continued*): Results: Hypertension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		(0.389)							
Post×Poor×Dem.		-0.814							
		(1.593)							
Phone			-0.085						
			(0.077)						
Post×Phone			0.179						
			(0.306)						
Phone×Dem.			-0.337						
			(0.693)						
Post×Phone×Dem.			0.686						
			(1.673)						
Bank				-0.029					
				(0.087)					
Post×Bank				-0.791**					
				(0.333)					
Bank×Dem.				0.120					
				(0.574)					
Post×Bank×Dem.				-0.786					
				(1.413)					
Food controls									
Milk						-0.077*			-0.092
						(0.041)			(0.065)
Pulses/beans						-0.033			-0.018
						(0.046)			(0.075)
Vegetables						-0.003			0.095
						(0.054)			(0.093)
Fruits						0.031			0.105
						(0.041)			(0.066)
Eggs						-0.018			-0.015
						(0.042)			(0.067)
Fish						0.150***			0.034
						(0.049)			(0.078)
Meat						-0.020			-0.026
						(0.042)			(0.067)
Fried food						-0.034			-0.070
						(0.041)			(0.065)
Aerated drinks						-0.055			-0.021
						(0.055)			(0.083)
Occupation controls									
no							0		0
prof./tech./manag.							-0.141		-0.153
							(0.151)		(0.152)
clerical							-0.001		-0.017
							(0.316)		(0.319)
sales							0.057		0.051
							(0.124)		(0.122)
agricultural							-0.021		-0.032
							(0.085)		(0.086)
services							-0.103		-0.100
							(0.150)		(0.151)
manual							0.014		0.014

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Table B.2 (*Continued*): Results: Hypertension

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
							(0.095)		(0.095)
don't know							-0.327		-0.342
							(0.546)		(0.542)
Geospatial controls									
Ln pop. index								0.000	-0.007
								(0.009)	(0.017)
Ln month temp.								-0.278***	-0.215**
								(0.061)	(0.090)
Ln slope								-0.067***	-0.080**
								(0.023)	(0.036)
Ln PPP								-0.024	-0.095
								(0.093)	(0.156)
Ln nighlight								-0.015	-0.039
								(0.016)	(0.027)
Ln vegetation								0.383***	0.225
								(0.118)	(0.182)
Ln aridity								0.003	0.008
								(0.133)	(0.215)
Constant	-19.19***	-19.22***	-19.14***	-19.22***	-19.28***	-19.19***	-19.83***	-21.37***	-20.38***
	(0.82)	(0.82)	(0.82)	(0.83)	(0.91)	(0.82)	(1.36)	(1.36)	(2.11)
Observations	69363	69363	69363	69295	69363	69363	23121	69051	23062
Mean dep. var.	0.140	0.140	0.140	0.140	0.140	0.140	0.155	0.140	0.155
p-value	0.241	0.077	0.418	0.251	0.868	0.806	0.253	0.454	0.348
Month FE	No	No	No	No	Yes	No	No	No	No

Notes: Dependent variable: hypertension. Standard errors in parentheses. Logit regression. State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table 2 gives the main results. *p<0.1, **p<0.05, ***p<0.01.

Table B.3: Results: Systolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.022***	0.027***	0.026***	0.042***	-0.003	0.021***	0.013*	0.009*	-0.001
	(0.006)	(0.007)	(0.010)	(0.013)	(0.008)	(0.006)	(0.007)	(0.005)	(0.007)
Dem.	0.000	0.024	0.021	0.014	-0.002	0.001	0.021	0.010	0.034
	(0.017)	(0.020)	(0.034)	(0.026)	(0.017)	(0.017)	(0.028)	(0.016)	(0.028)
Post×Dem.	0.002	-0.008	0.074	0.079	-0.002	0.002	-0.020	-0.022	-0.043
	(0.022)	(0.034)	(0.050)	(0.051)	(0.022)	(0.022)	(0.041)	(0.022)	(0.044)
Bp controls									
Bp time	0.036***	0.036***	0.036***	0.036***	0.039***	0.036***	0.011	0.034***	0.011
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.006)	(0.009)
Eaten 30m	0.001	0.001	0.001	0.001	0.001	0.001	0.004*	0.001	0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Coffe/tea 30m	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***	0.006**	0.010***	0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Smoked 30 m	-0.005	-0.005	-0.005	-0.005	-0.003	-0.005	-0.004	-0.004	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)
Oth. tobacco 30m	0.003	0.003	0.003	0.003	0.004	0.003	-0.001	0.004	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Ln arm circumf.	0.066***	0.066***	0.066***	0.066***	0.074***	0.067***	0.067***	0.072***	0.073***

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Table B.3 (*Continued*): Results: Systolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.016)	(0.010)	(0.015)
Cuffsize									
small	0	0	0	0	0	0	0	0	0
medium	-0.000	-0.000	-0.000	-0.001	-0.000	-0.000	0.000	-0.001	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
large	-0.025***	-0.025***	-0.025***	-0.025***	-0.025***	-0.025***	-0.015	-0.026***	-0.016*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.006)	(0.009)
Individual controls									
Man	0.041***	0.041***	0.041***	0.041***	0.039***	0.040***	0.044***	0.040***	0.044***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	0.003***	0.003***	0.003***	0.003***	0.002***	0.003***	0.002***	0.003***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln BMI	0.110***	0.110***	0.110***	0.110***	0.108***	0.110***	0.123***	0.107***	0.120***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.005)	(0.008)
Education									
no	0	0	0	0	0	0	0	0	0
incomp. prim.	-0.006**	-0.006**	-0.005**	-0.006**	-0.006**	-0.005**	-0.001	-0.005**	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)
comp. prim.	-0.007***	-0.007***	-0.006**	-0.007***	-0.007***	-0.006**	-0.008*	-0.006**	-0.007
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
incomp. sec.	-0.010***	-0.010***	-0.010***	-0.010***	-0.009***	-0.009***	-0.010***	-0.010***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
comp. sec.	-0.015***	-0.015***	-0.014***	-0.015***	-0.014***	-0.014***	-0.010***	-0.015***	-0.009**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
higher	-0.017***	-0.017***	-0.016***	-0.017***	-0.016***	-0.016***	-0.010**	-0.017***	-0.010**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
Urban	-0.006***	-0.006***	-0.006***	-0.006***	-0.008***	-0.006***	-0.002		
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)		
Ln altitude	-0.000	-0.000	-0.000	-0.000	0.003**	-0.000	-0.001	-0.000	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Drinks alcohol									
no	0	0	0	0	0	0	0	0	0
<1/week	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.010***	0.013***	0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)
∼1/week	0.013***	0.013***	0.012***	0.013***	0.013***	0.012***	0.012***	0.014***	0.015***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
>1/day	0.016***	0.016***	0.016***	0.016***	0.016***	0.016***	0.008	0.017***	0.010
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
Uses tobacco	-0.001	-0.001	-0.002	-0.002	-0.001	-0.002	-0.002	-0.003	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Diabetes									
no	0	0	0	0	0	0	0	0	0
yes	0.015***	0.015***	0.015***	0.015***	0.016***	0.014***	0.006	0.016***	0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)	(0.005)	(0.007)
don't know	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	-0.013	-0.010	-0.015
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.010)	(0.007)	(0.010)
Bp medicine	0.042***	0.042***	0.042***	0.042***	0.042***	0.042***	0.048***	0.042***	0.048***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.004)	(0.007)
Bp told high	0.018***	0.018***	0.018***	0.018***	0.019***	0.018***	0.021***	0.017***	0.020***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
Wealth status									
poorest	0	0	0	0	0	0	0	0	0

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Table B.3 (*Continued*): Results: Systolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
poorer	-0.009***	-0.009***	-0.008***	-0.009***	-0.010***	-0.009***	-0.006*	-0.010***	-0.006*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
middle	-0.016***	-0.015***	-0.014***	-0.015***	-0.017***	-0.015***	-0.010***	-0.017***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
richer	-0.017***	-0.015***	-0.016***	-0.017***	-0.019***	-0.016***	-0.008**	-0.018***	-0.008**
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
richest	-0.019***	-0.017***	-0.018***	-0.019***	-0.020***	-0.017***	-0.011**	-0.019***	-0.010**
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.005)
Poor		0.001							
		(0.003)							
Post×Poor		-0.012							
		(0.009)							
Poor×Dem.		-0.037**							
		(0.019)							
Post×Poor×Dem.		0.008							
		(0.040)							
Phone			-0.009***						
			(0.003)						
Post×Phone			-0.005						
			(0.011)						
Phone×Dem.			-0.022						
			(0.030)						
Post×Phone×Dem.			-0.079						
			(0.057)						
Bank				-0.002					
				(0.003)					
Post×Bank				-0.021					
				(0.013)					
Bank×Dem.				-0.014					
				(0.024)					
Post×Bank×Dem.				-0.084					
				(0.056)					
Food controls									
Milk						-0.002			-0.001
						(0.001)			(0.002)
Pulses/beans						-0.003			-0.001
						(0.002)			(0.003)
Vegetables						-0.002			0.001
						(0.002)			(0.003)
Fruits						-0.001			0.001
						(0.001)			(0.002)
Eggs						0.004***			0.003
						(0.001)			(0.002)
Fish						0.001			-0.001
						(0.002)			(0.003)
Meat						-0.000			-0.001
						(0.002)			(0.002)
Fried food						-0.004***			-0.004*
						(0.001)			(0.002)
Aerated drinks						-0.001			0.002
						(0.002)			(0.003)

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Table B.3 (*Continued*): Results: Systolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Occupation controls									
no							0		0
prof./tech./manag.							-0.003		-0.003
							(0.005)		(0.005)
clerical							0.004		0.002
							(0.013)		(0.013)
sales							0.002		0.001
							(0.004)		(0.004)
agricultural							0.003		0.002
							(0.003)		(0.003)
services							0.003		0.004
							(0.005)		(0.005)
manual							0.001		0.001
							(0.003)		(0.003)
don't know							-0.010		-0.010
							(0.011)		(0.011)
Geospatial controls									
Ln pop. index								-0.000	-0.001
								(0.000)	(0.001)
Ln month temp.								-0.022***	-0.026***
								(0.003)	(0.005)
Ln slope								-0.003***	-0.004***
								(0.001)	(0.001)
Ln PPP								0.013***	0.010
								(0.003)	(0.006)
Ln nighlight								-0.002***	-0.001
								(0.001)	(0.001)
Ln vegetation								0.002	-0.000
								(0.005)	(0.007)
Ln aridity								0.030***	0.023**
								(0.006)	(0.009)
Constant	3.627***	3.629***	3.632***	3.626***	3.586***	3.631***	3.556***	3.472***	3.492***
	(0.033)	(0.034)	(0.033)	(0.033)	(0.036)	(0.033)	(0.054)	(0.053)	(0.083)
Observations	69361	69361	69361	69293	69361	69361	23121	69049	23062
Mean dep. var.	4.759	4.759	4.759	4.759	4.759	4.759	4.774	4.759	4.774
R^2	0.189	0.189	0.189	0.189	0.193	0.189	0.198	0.194	0.205
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Month FE	No	No	No	No	Yes	No	No	No	No

Notes: Dependent variable: ln(systolic blood pressure). Standard errors in parentheses. State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Table 3 gives the main results. *p<0.1, **p<0.05, ***p<0.01.

Table B.4: Results: Diastolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.016**	0.013	0.028***	0.045***	0.009	0.016**	0.008	0.005	-0.002
	(0.007)	(0.010)	(0.009)	(0.015)	(0.010)	(0.007)	(0.010)	(0.007)	(0.010)
Dem.	-0.040**	-0.031	0.014	-0.011	-0.016	-0.038**	-0.021	-0.006	0.020
	(0.018)	(0.020)	(0.034)	(0.025)	(0.018)	(0.018)	(0.031)	(0.018)	(0.031)

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Table B.4 (*Continued*): Results: Diastolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post×Dem.	0.065**	0.065	0.053	0.113**	0.054**	0.064**	0.035	0.033	0.005
	(0.026)	(0.043)	(0.054)	(0.056)	(0.026)	(0.026)	(0.056)	(0.026)	(0.058)
Bp controls									
Bp time	0.021***	0.021***	0.021***	0.021***	0.023***	0.021***	-0.005	0.020***	-0.005
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.006)	(0.010)
Eaten 30m	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Coffe/tea 30m	0.010***	0.010***	0.010***	0.010***	0.010***	0.011***	0.009***	0.011***	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Smoked 30 m	-0.003	-0.003	-0.003	-0.003	-0.001	-0.003	-0.004	-0.003	-0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Oth. tobacco 30m	0.005	0.005	0.005	0.005	0.006	0.005	0.002	0.005	0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
Ln arm circumf.	0.053***	0.053***	0.053***	0.053***	0.060***	0.054***	0.062***	0.058***	0.067***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.012)	(0.010)	(0.011)
Cuffsize									
small	0	0	0	0	0	0	0	0	0
medium	-0.004*	-0.004*	-0.004*	-0.004*	-0.004**	-0.004*	-0.007*	-0.004**	-0.007*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
large	-0.014**	-0.014**	-0.014**	-0.014**	-0.015***	-0.014**	-0.017*	-0.014**	-0.018*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.009)	(0.006)	(0.009)
Individual controls									
Man	0.013***	0.013***	0.013***	0.013***	0.012***	0.013***	0.015***	0.013***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Age	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln BMI	0.111***	0.111***	0.111***	0.111***	0.110***	0.111***	0.120***	0.109***	0.118***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.008)	(0.005)	(0.008)
Education									
no	0	0	0	0	0	0	0	0	0
incomp. prim.	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.005	-0.001	0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)
comp. prim.	-0.000	-0.000	0.000	-0.000	-0.001	-0.000	0.001	-0.000	0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)
incomp. sec.	-0.007***	-0.007***	-0.006***	-0.007***	-0.007***	-0.006***	-0.004	-0.007***	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
comp. sec.	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.006	-0.008***	-0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
higher	-0.008***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	0.002	-0.008***	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
Urban	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001	-0.001		
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)		
Ln altitude	-0.005***	-0.005***	-0.005***	-0.005***	-0.001	-0.005***	-0.007***	-0.005***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Drinks alcohol									
no	0	0	0	0	0	0	0	0	0
<1/week	0.015***	0.015***	0.015***	0.015***	0.014***	0.014***	0.018***	0.016***	0.019***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
∼1/week	0.021***	0.021***	0.021***	0.021***	0.020***	0.021***	0.021***	0.022***	0.021***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
>1/day	0.030***	0.030***	0.030***	0.030***	0.029***	0.030***	0.024***	0.031***	0.024***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.006)	(0.008)

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Table B.4 (*Continued*): Results: Diastolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Uses tobacco	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Diabetes									
no	0	0	0	0	0	0	0	0	0
yes	0.008*	0.008*	0.008*	0.008	0.009*	0.008	0.001	0.008	0.000
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.005)	(0.008)
don't know	-0.002	-0.002	-0.002	-0.002	-0.005	-0.002	-0.002	-0.004	-0.005
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.012)	(0.008)	(0.012)
Bp medicine	0.038***	0.038***	0.038***	0.038***	0.038***	0.038***	0.048***	0.038***	0.048***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.004)	(0.007)
Bp told high	0.014***	0.014***	0.014***	0.014***	0.014***	0.014***	0.013***	0.013***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)
Wealth status									
poorest	0	0	0	0	0	0	0	0	0
poorer	-0.004**	-0.004**	-0.003	-0.004**	-0.006***	-0.004**	-0.001	-0.006***	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
middle	-0.007***	-0.006**	-0.006**	-0.007***	-0.009***	-0.006***	-0.001	-0.009***	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
richer	-0.009***	-0.007**	-0.007***	-0.008***	-0.011***	-0.008***	-0.001	-0.011***	-0.002
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
richest	-0.006**	-0.005	-0.005	-0.006*	-0.009***	-0.005	-0.002	-0.009***	-0.003
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.003)	(0.006)
Poor		0.001							
		(0.003)							
Post×Poor		0.006							
		(0.011)							
Poor×Dem.		-0.014							
		(0.019)							
Post×Poor×Dem.		0.009							
		(0.049)							
Phone			-0.010***						
			(0.003)						
Post×Phone			-0.013						
			(0.011)						
Phone×Dem.			-0.058*						
			(0.030)						
Post×Phone×Dem.			0.012						
			(0.062)						
Bank				-0.002					
				(0.003)					
Post×Bank				-0.031**					
				(0.016)					
Bank×Dem.				-0.032					
				(0.023)					
Post×Bank×Dem.				-0.049					
				(0.060)					
Food controls									
Milk						-0.003**			-0.004
						(0.001)			(0.002)
Pulses/beans						0.000			0.001
						(0.002)			(0.003)
Vegetables						-0.002			0.001

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Table B.4 (*Continued*): Results: Diastolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
						(0.002)			(0.003)
Fruits						0.001			0.005*
						(0.002)			(0.003)
Eggs						0.002			0.001
						(0.002)			(0.003)
Fish						0.004**			-0.001
						(0.002)			(0.003)
Meat						-0.001			-0.001
						(0.002)			(0.003)
Fried food						-0.004***			-0.004*
						(0.001)			(0.002)
Aerated drinks						0.001			0.005
						(0.002)			(0.003)
Occupation controls									
no							0		0
prof./tech./manag.							0.001		0.001
							(0.005)		(0.005)
clerical							-0.006		-0.007
							(0.016)		(0.016)
sales							0.009*		0.008*
							(0.005)		(0.005)
agricultural							-0.001		-0.001
							(0.003)		(0.003)
services							0.010**		0.010*
							(0.005)		(0.005)
manual							0.001		0.001
							(0.003)		(0.003)
don't know							0.007		0.008
							(0.013)		(0.012)
Geospatial controls									
Ln pop. index								0.000	-0.000
								(0.000)	(0.001)
Ln month temp.								-0.024***	-0.024***
								(0.004)	(0.005)
Ln slope								-0.001	-0.001
								(0.001)	(0.002)
Ln PPP								0.014***	0.008
								(0.004)	(0.006)
Ln nighlight								0.000	0.001
								(0.001)	(0.001)
Ln vegetation								0.013**	0.018**
								(0.005)	(0.009)
Ln aridity								0.014**	0.002
								(0.007)	(0.010)
Constant	3.251***	3.249***	3.256***	3.251***	3.241***	3.252***	3.190***	3.067***	3.064***
	(0.036)	(0.036)	(0.036)	(0.036)	(0.038)	(0.036)	(0.057)	(0.056)	(0.092)
Observations	69361	69361	69361	69293	69361	69361	23121	69049	23062
Mean dep. var.	4.348	4.348	4.348	4.348	4.348	4.348	4.353	4.348	4.353
R^2	0.172	0.173	0.173	0.173	0.177	0.173	0.189	0.177	0.192
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Month FE	No	No	No	No	Yes	No	No	No	No

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Table B.4 (*Continued*): Results: Diastolic blood pressure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Notes: Dependent variable: ln(diastolic blood pressure). Standard errors in parentheses. State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Table 4 gives the main results. *p<0.1, **p<0.05, ***p<0.01.

Table B.5: Results: Glucose level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.021**	0.016	0.002	0.042**	0.032*	0.020**	0.023	0.017	0.017
	(0.010)	(0.015)	(0.017)	(0.020)	(0.016)	(0.010)	(0.017)	(0.011)	(0.017)
Dem.	0.012	0.054*	-0.100**	-0.047	0.023	0.009	0.077	0.019	0.066
	(0.026)	(0.028)	(0.047)	(0.039)	(0.027)	(0.026)	(0.053)	(0.026)	(0.053)
Post×Dem.	0.008	-0.000	0.125	0.033	-0.005	0.008	-0.122	-0.006	-0.132
	(0.055)	(0.067)	(0.124)	(0.098)	(0.056)	(0.055)	(0.157)	(0.057)	(0.165)
Glucose controls									
Glucose time	0.072***	0.073***	0.073***	0.072***	0.071***	0.073***	0.056***	0.070***	0.058***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.018)	(0.010)	(0.018)
Time eaten	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.013***	-0.012***	-0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Time drank non-water	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Diabetes									
no	0	0	0	0	0	0	0	0	0
yes	0.227***	0.227***	0.227***	0.225***	0.228***	0.227***	0.203***	0.228***	0.204***
	(0.021)	(0.021)	(0.021)	(0.020)	(0.020)	(0.021)	(0.029)	(0.021)	(0.029)
don't know	-0.004	-0.004	-0.004	-0.004	-0.003	-0.004	-0.000	-0.004	-0.002
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.016)	(0.010)	(0.016)
Individual controls									
Man	0.015***	0.016***	0.016***	0.015***	0.015***	0.016***	0.007	0.016***	0.008
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
Age	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln BMI	0.086***	0.086***	0.086***	0.086***	0.087***	0.086***	0.097***	0.086***	0.095***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.012)	(0.006)	(0.012)
Education									
no	0	0	0	0	0	0	0	0	0
incomp. prim.	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.005)	(0.009)
comp. prim.	0.001	0.001	0.001	0.001	0.001	0.001	0.015	0.000	0.015
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.010)	(0.005)	(0.009)
incomp. sec.	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.006	-0.001	0.006
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)
comp. sec.	-0.012***	-0.011***	-0.011***	-0.012***	-0.011***	-0.011***	-0.004	-0.011**	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.004)	(0.008)
higher	-0.010**	-0.009**	-0.009**	-0.010**	-0.009**	-0.009**	-0.006	-0.010**	-0.007
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)	(0.004)	(0.008)
Urban	0.004	0.005	0.004	0.005	0.002	0.004	0.003		
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)		
Ln altitude	0.004**	0.004**	0.004**	0.004**	0.005**	0.004**	0.005	0.007***	0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)

Continued on next page

Table B.5 (*Continued*): Results: Glucose level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Drinks alcohol									
no	0	0	0	0	0	0	0	0	0
<1/week	-0.003	-0.004	-0.004	-0.003	-0.004	-0.003	-0.006	-0.003	-0.005
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.007)	(0.009)
∼1/week	0.006	0.005	0.005	0.006	0.005	0.006	0.008	0.007	0.012
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.006)	(0.009)
>1/day	-0.010	-0.011	-0.011	-0.010	-0.011	-0.010	0.001	-0.009	0.003
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.008)	(0.012)
Uses tobacco	0.004	0.004	0.004	0.004	0.004	0.004	0.006	0.003	0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)	(0.006)
Bp medicine	0.020***	0.020***	0.020***	0.019**	0.021***	0.020***	0.029*	0.020***	0.029*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.015)	(0.008)	(0.015)
Bp told high	0.014***	0.014***	0.014***	0.014***	0.015***	0.014***	0.019**	0.013***	0.020***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.004)	(0.008)
Wealth status									
poorest	0	0	0	0	0	0	0	0	0
poorer	0.009***	0.009***	0.009***	0.008***	0.007**	0.009***	0.010*	0.006*	0.009
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.003)	(0.006)
middle	0.014***	0.016***	0.015***	0.013***	0.012***	0.014***	0.010	0.009**	0.006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)	(0.007)
richer	0.020***	0.023***	0.020***	0.018***	0.017***	0.019***	0.017**	0.013***	0.011
	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)	(0.004)	(0.008)
richest	0.024***	0.027***	0.024***	0.022***	0.022***	0.024***	0.020**	0.016***	0.013
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.005)	(0.009)
Poor		0.001							
		(0.005)							
Post×Poor		0.011							
		(0.018)							
Poor×Dem.		-0.072***							
		(0.027)							
Post×Poor×Dem.		0.034							
		(0.088)							
Phone			0.002						
			(0.004)						
Post×Phone			0.020						
			(0.020)						
Phone×Dem.			0.126***						
			(0.041)						
Post×Phone×Dem.			-0.131						
			(0.112)						
Bank				0.012***					
				(0.004)					
Post×Bank				-0.022					
				(0.025)					
Bank×Dem.				0.064*					
				(0.035)					
Post×Bank×Dem.				-0.023					
				(0.099)					
Food controls									
Milk						-0.001			-0.002
						(0.002)			(0.004)
Pulses/beans						-0.001			-0.009

Continued on next page

Table B.5 (*Continued*): Results: Glucose level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
						(0.003)			(0.006)
Vegetables						0.007**			0.015***
						(0.003)			(0.005)
Fruits						-0.000			0.000
						(0.003)			(0.004)
Eggs						-0.001			0.004
						(0.003)			(0.005)
Fish						-0.001			-0.010*
						(0.003)			(0.006)
Meat						0.004			0.002
						(0.003)			(0.005)
Fried food						-0.002			0.000
						(0.003)			(0.005)
Aerated drinks						-0.001			0.004
						(0.003)			(0.006)
Occupation controls									
no							0		0
prof./tech./manag.							0.012		0.013
							(0.011)		(0.011)
clerical							-0.002		-0.002
							(0.027)		(0.028)
sales							-0.007		-0.008
							(0.009)		(0.009)
agricultural							0.002		0.000
							(0.006)		(0.006)
services							-0.008		-0.007
							(0.009)		(0.009)
manual							0.004		0.002
							(0.006)		(0.006)
don't know							-0.085***		-0.084***
							(0.022)		(0.022)
Geospatial controls									
Ln pop. index								0.001*	0.003***
								(0.001)	(0.001)
Ln month temp.								0.001	-0.002
								(0.005)	(0.007)
Ln slope								-0.003	-0.003
								(0.002)	(0.003)
Ln PPP								0.006	-0.002
								(0.006)	(0.011)
Ln nighlight								0.001	-0.002
								(0.001)	(0.002)
Ln vegetation								0.009	0.011
								(0.008)	(0.014)
Ln aridity								0.027***	0.032*
								(0.009)	(0.017)
Constant	3.799***	3.796***	3.797***	3.788***	3.833***	3.797***	3.745***	3.571***	3.562***
	(0.050)	(0.050)	(0.050)	(0.050)	(0.059)	(0.050)	(0.094)	(0.085)	(0.147)
Observations	75679	75679	75679	75605	75679	75679	25197	75358	25139
Mean dep. var.	4.623	4.623	4.623	4.623	4.623	4.623	4.633	4.623	4.633
R^2	0.108	0.108	0.108	0.108	0.110	0.108	0.107	0.110	0.109

Continued on next page

Table B.5 (*Continued*): Results: Glucose level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Month FE	No	No	No	No	Yes	No	No	No	No

Notes: Dependent variable: ln(glucose level). Standard errors in parentheses. State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Table 5 gives the main results. *p<0.1, **p<0.05, ***p<0.01.

Table B.6: Results: Frequency drinks alcohol

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.081	-0.046	-0.513	-0.533	1.054***	-0.163	0.339*	0.148
	(0.190)	(0.268)	(0.358)	(0.407)	(0.256)	(0.204)	(0.189)	(0.206)
Dem.	-3.858***	-2.564***	-3.913***	-3.141***	-2.583***	-3.698***	-2.767***	-1.747**
	(0.469)	(0.428)	(0.850)	(0.544)	(0.407)	(0.745)	(0.437)	(0.693)
Post×Dem.	1.582**	0.838	2.010	0.940	1.503**	0.907	1.476*	0.106
	(0.739)	(0.860)	(1.484)	(1.327)	(0.725)	(0.832)	(0.803)	(1.053)
Individual controls								
Man	2.109***	2.113***	2.126***	2.112***	2.244***	1.836***	2.261***	1.899***
	(0.076)	(0.076)	(0.076)	(0.076)	(0.078)	(0.101)	(0.078)	(0.100)
Age	0.032***	0.032***	0.032***	0.033***	0.032***	0.022***	0.033***	0.022***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Ln BMI	0.011	0.008	0.046	0.007	-0.021	-0.082	0.030	0.011
	(0.132)	(0.132)	(0.133)	(0.133)	(0.134)	(0.191)	(0.132)	(0.189)
Education								
no	0	0	0	0	0	0	0	0
incomp. prim.	-0.391***	-0.395***	-0.362***	-0.376***	-0.405***	-0.327**	-0.396***	-0.365***
	(0.097)	(0.097)	(0.098)	(0.098)	(0.099)	(0.127)	(0.099)	(0.130)
comp. prim.	-0.328***	-0.329***	-0.287***	-0.310***	-0.362***	-0.103	-0.348***	-0.153
	(0.102)	(0.102)	(0.101)	(0.103)	(0.107)	(0.136)	(0.105)	(0.139)
incomp. sec.	-0.498***	-0.498***	-0.444***	-0.476***	-0.557***	-0.317***	-0.549***	-0.365***
	(0.063)	(0.063)	(0.063)	(0.063)	(0.064)	(0.082)	(0.065)	(0.085)
comp. sec.	-0.542***	-0.541***	-0.481***	-0.512***	-0.606***	-0.376***	-0.603***	-0.428***
	(0.096)	(0.096)	(0.097)	(0.097)	(0.098)	(0.116)	(0.099)	(0.121)
higher	-0.608***	-0.610***	-0.561***	-0.583***	-0.640***	-0.473***	-0.582***	-0.412***
	(0.111)	(0.111)	(0.111)	(0.112)	(0.113)	(0.135)	(0.112)	(0.132)
Urban	-0.282***	-0.291***	-0.292***	-0.288***	-0.198*	-0.260**		
	(0.103)	(0.103)	(0.103)	(0.103)	(0.109)	(0.126)		
Ln altitude	0.168***	0.168***	0.166***	0.168***	0.201***	-0.042	-0.066	-0.176**
	(0.058)	(0.058)	(0.057)	(0.057)	(0.064)	(0.069)	(0.065)	(0.075)
Uses tobacco	1.850***	1.846***	1.835***	1.847***	1.844***	1.527***	1.885***	1.615***
	(0.067)	(0.067)	(0.067)	(0.067)	(0.067)	(0.079)	(0.067)	(0.083)
Diabetes								
no	0	0	0	0	0	0	0	0
yes	0.013	0.005	0.023	0.010	-0.096	0.103	-0.113	-0.025
	(0.223)	(0.224)	(0.225)	(0.222)	(0.218)	(0.242)	(0.211)	(0.226)
don't know	0.692***	0.702***	0.677***	0.687***	0.519***	0.681**	0.630***	0.583*
	(0.170)	(0.170)	(0.170)	(0.171)	(0.181)	(0.307)	(0.173)	(0.328)
Bp medicine	-0.211	-0.204	-0.214	-0.211	-0.233	-0.205	-0.190	-0.184
	(0.156)	(0.156)	(0.156)	(0.157)	(0.160)	(0.199)	(0.162)	(0.210)
Bp told high	-0.262**	-0.260**	-0.253**	-0.263**	-0.312***	-0.226*	-0.252**	-0.215
	(0.109)	(0.109)	(0.109)	(0.109)	(0.117)	(0.135)	(0.116)	(0.143)

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Table B.6 (*Continued*): Results: Frequency drinks alcohol

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wealth status								
poorest	0	0	0	0	0	0	0	0
poorer	-0.966***	-0.979***	-0.863***	-0.944***	-0.933***	-0.490***	-0.816***	-0.397***
	(0.074)	(0.075)	(0.076)	(0.075)	(0.076)	(0.099)	(0.075)	(0.105)
middle	-1.074***	-1.052***	-0.953***	-1.039***	-1.003***	-0.576***	-0.877***	-0.463***
	(0.088)	(0.107)	(0.093)	(0.090)	(0.091)	(0.114)	(0.109)	(0.142)
richer	-1.027***	-0.961***	-0.910***	-0.991***	-0.969***	-0.548***	-0.897***	-0.513***
	(0.111)	(0.148)	(0.114)	(0.113)	(0.114)	(0.138)	(0.122)	(0.156)
richest	-0.626***	-0.586***	-0.520***	-0.591***	-0.650***	-0.099	-0.521***	-0.128
	(0.134)	(0.169)	(0.136)	(0.135)	(0.137)	(0.170)	(0.148)	(0.192)
Poor		-0.093						
		(0.125)						
Post×Poor		0.190						
		(0.339)						
Poor×Dem.		-2.203***						
		(0.462)						
Post×Poor×Dem.		1.419						
		(1.172)						
Phone			-0.537***					
			(0.088)					
Post×Phone			0.694*					
			(0.364)					
Phone×Dem.			0.070					
			(0.721)					
Post×Phone×Dem.			-0.495					
			(1.510)					
Bank				-0.361***				
				(0.092)				
Post×Bank				0.680*				
				(0.351)				
Bank×Dem.				-0.811*				
				(0.478)				
Post×Bank×Dem.				0.645				
				(1.267)				
Occupation controls								
no						0		0
prof./tech./manag.						0.270		0.261
						(0.175)		(0.168)
clerical						1.271***		1.168***
						(0.271)		(0.282)
sales						0.798***		0.821***
						(0.138)		(0.139)
agricultural						0.718***		0.728***
						(0.125)		(0.125)
services						0.817***		0.807***
						(0.136)		(0.138)
manual						1.000***		1.033***
						(0.099)		(0.105)
don't know						1.563***		1.522***
						(0.401)		(0.427)
Geospatial controls								

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Table B.6 (*Continued*): Results: Frequency drinks alcohol

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln pop. index							-0.010	-0.028
							(0.019)	(0.028)
Ln month temp.							0.178	0.209
							(0.178)	(0.186)
Ln slope							0.095*	0.045
							(0.053)	(0.053)
Ln PPP							1.299***	0.981***
							(0.173)	(0.202)
Ln nighlight							-0.002	0.034
							(0.044)	(0.055)
Ln vegetation							2.317***	1.671***
							(0.403)	(0.346)
Ln aridity							-3.097***	-3.298***
							(0.319)	(0.352)
Cut1	3.751***	3.681***	3.659***	3.455***	1.881*	2.356	20.050***	11.077***
	(1.099)	(1.107)	(1.107)	(1.107)	(1.131)	(1.556)	(3.646)	(3.599)
Cut2	4.580***	4.511***	4.490***	4.283***	2.724**	3.419**	20.905***	12.176***
	(1.099)	(1.108)	(1.107)	(1.107)	(1.132)	(1.559)	(3.644)	(3.597)
Cut3	6.057***	5.990***	5.972***	5.761***	4.226***	4.950***	22.419***	13.735***
	(1.093)	(1.102)	(1.101)	(1.100)	(1.127)	(1.554)	(3.641)	(3.589)
Observations	76720	76720	76720	76644	76683	25501	76392	25442
Mean dep. var.	0.188	0.188	0.188	0.188	0.188	0.295	0.188	0.294
MZ-R^2	0.479	0.478	0.479	0.479	0.489	0.528	0.500	0.559
McFadden-R^2	0.271	0.271	0.271	0.271	0.275	0.275	0.281	0.291
Adj.McFad.-R^2	0.270	0.270	0.271	0.270	0.274	0.272	0.280	0.289
Cox-Snell/ML-R^2	0.217	0.217	0.218	0.217	0.220	0.290	0.225	0.304
Cra.-U./Nagel.-R^2	0.365	0.365	0.366	0.365	0.370	0.407	0.377	0.427
Count-R^2	0.894	0.894	0.894	0.894	0.894	0.843	0.894	0.843
Adj.Count-R^2	0.027	0.026	0.026	0.026	0.027	0.061	0.026	0.062
Month FE	No	No	No	No	Yes	No	No	No

Notes: Dependent variable: frequency drinks alcohol. Standard errors in parentheses. Ordered Logit regression. State FE are included. In (5) January FE is omitted because it predicts perfectly (44 observations omitted) DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Frequency drinks alcohol (0-3): 0 no alcohol, 1 less than once a week, 2 about once a week, 3 almost every day. R^2 computed with *fitstat* without sample weights, clusters and strata (Long & Freese, 2014). Table 6 gives the main results. *p<0.1, **p<0.05, ***p<0.01.

Table B.7: Results: Tobacco use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.138	0.355	-0.502*	-0.038	-0.015	0.394**	0.020	0.244
	(0.158)	(0.253)	(0.288)	(0.344)	(0.247)	(0.200)	(0.163)	(0.206)
Dem.	-1.019**	-0.927**	0.380	0.200	-0.981**	-0.144	-0.988**	-0.678
	(0.401)	(0.424)	(0.746)	(0.658)	(0.404)	(0.619)	(0.396)	(0.612)
Post×Dem.	-1.896**	-1.381	-4.249***	-2.913**	-1.836**	-0.605	-2.355***	-0.592
	(0.770)	(1.359)	(1.438)	(1.269)	(0.745)	(1.242)	(0.848)	(1.439)
Individual controls								
Man	3.004***	3.006***	3.012***	3.005***	3.020***	2.480***	3.032***	2.477***
	(0.061)	(0.062)	(0.062)	(0.061)	(0.061)	(0.082)	(0.062)	(0.082)
Age	0.056***	0.056***	0.056***	0.056***	0.056***	0.038***	0.056***	0.039***

Continued on next page

Table B.7 (*Continued*): Results: Tobacco use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Ln BMI	-0.647***	-0.648***	-0.632***	-0.650***	-0.670***	-0.301	-0.642***	-0.322*
	(0.140)	(0.140)	(0.140)	(0.140)	(0.140)	(0.186)	(0.141)	(0.189)
Education								
no	0	0	0	0	0	0	0	0
incomp. prim.	-0.305***	-0.302***	-0.294***	-0.303***	-0.297***	0.079	-0.298***	0.101
	(0.083)	(0.083)	(0.083)	(0.083)	(0.083)	(0.124)	(0.084)	(0.125)
comp. prim.	-0.599***	-0.596***	-0.586***	-0.598***	-0.596***	-0.504***	-0.579***	-0.465***
	(0.101)	(0.101)	(0.101)	(0.101)	(0.100)	(0.134)	(0.101)	(0.135)
incomp. sec.	-0.913***	-0.909***	-0.898***	-0.910***	-0.910***	-0.598***	-0.905***	-0.564***
	(0.059)	(0.059)	(0.059)	(0.059)	(0.059)	(0.081)	(0.059)	(0.080)
comp. sec.	-1.261***	-1.256***	-1.245***	-1.256***	-1.257***	-0.905***	-1.247***	-0.863***
	(0.092)	(0.093)	(0.092)	(0.093)	(0.092)	(0.113)	(0.094)	(0.114)
higher	-1.592***	-1.587***	-1.581***	-1.587***	-1.606***	-1.151***	-1.598***	-1.134***
	(0.095)	(0.096)	(0.096)	(0.096)	(0.095)	(0.115)	(0.096)	(0.114)
Urban	0.242***	0.238***	0.238***	0.239***	0.206***	0.177**		
	(0.069)	(0.070)	(0.069)	(0.070)	(0.070)	(0.085)		
Ln altitude	0.109***	0.105***	0.111***	0.111***	0.004	0.188***	0.208***	0.222***
	(0.038)	(0.038)	(0.038)	(0.038)	(0.043)	(0.052)	(0.040)	(0.057)
Drinks alcohol								
no	0	0	0	0	0	0	0	0
<1/week	1.813***	1.814***	1.801***	1.810***	1.830***	1.549***	1.836***	1.589***
	(0.082)	(0.082)	(0.083)	(0.083)	(0.082)	(0.096)	(0.085)	(0.098)
∼1/week	1.861***	1.861***	1.845***	1.860***	1.842***	1.529***	1.927***	1.633***
	(0.085)	(0.085)	(0.085)	(0.085)	(0.085)	(0.105)	(0.086)	(0.107)
>1/day	2.087***	2.083***	2.068***	2.082***	2.031***	1.898***	2.141***	1.963***
	(0.150)	(0.150)	(0.150)	(0.149)	(0.149)	(0.205)	(0.152)	(0.208)
Diabetes								
no	0	0	0	0	0	0	0	0
yes	0.097	0.095	0.098	0.094	0.120	0.057	0.155	0.129
	(0.138)	(0.138)	(0.138)	(0.138)	(0.137)	(0.164)	(0.138)	(0.164)
don't know	0.134	0.131	0.134	0.134	0.173	0.069	0.131	0.116
	(0.204)	(0.203)	(0.204)	(0.203)	(0.204)	(0.273)	(0.205)	(0.269)
Bp medicine	-0.110	-0.109	-0.110	-0.111	-0.084	-0.120	-0.119	-0.133
	(0.108)	(0.108)	(0.108)	(0.108)	(0.109)	(0.147)	(0.111)	(0.152)
Bp told high	0.175***	0.175***	0.178***	0.173***	0.176***	0.185**	0.168**	0.177**
	(0.066)	(0.066)	(0.066)	(0.066)	(0.067)	(0.087)	(0.065)	(0.089)
Wealth status								
poorest	0	0	0	0	0	0	0	0
poorer	-0.148**	-0.148**	-0.107*	-0.133**	-0.135**	-0.149*	-0.217***	-0.200**
	(0.062)	(0.062)	(0.063)	(0.063)	(0.063)	(0.088)	(0.063)	(0.093)
middle	-0.227***	-0.157**	-0.181***	-0.211***	-0.230***	-0.135	-0.316***	-0.194*
	(0.065)	(0.073)	(0.067)	(0.066)	(0.068)	(0.092)	(0.069)	(0.100)
richer	-0.542***	-0.408***	-0.497***	-0.527***	-0.545***	-0.354***	-0.645***	-0.416***
	(0.078)	(0.109)	(0.080)	(0.080)	(0.081)	(0.102)	(0.085)	(0.115)
richest	-0.901***	-0.769***	-0.857***	-0.885***	-0.844***	-0.697***	-0.953***	-0.692***
	(0.103)	(0.127)	(0.104)	(0.104)	(0.103)	(0.132)	(0.108)	(0.144)
Poor		0.141*						
		(0.086)						
Post×Poor		-0.412						
		(0.279)						
Poor×Dem.		-0.130						

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Table B.7 (*Continued*): Results: Tobacco use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		(0.420)						
Post×Poor×Dem.		-1.000						
		(1.345)						
Phone			-0.327***					
			(0.080)					
Post×Phone			0.710**					
			(0.338)					
Phone×Dem.			-1.610**					
			(0.634)					
Post×Phone×Dem.			2.628					
			(1.656)					
Bank				-0.203**				
				(0.090)				
Post×Bank				0.192				
				(0.379)				
Bank×Dem.				-1.416**				
				(0.596)				
Post×Bank×Dem.				1.173				
				(1.396)				
Occupation controls								
no						0		0
prof./tech./manag.						0.524***		0.503***
						(0.139)		(0.137)
clerical						0.115		0.097
						(0.253)		(0.261)
sales						0.821***		0.833***
						(0.116)		(0.114)
agricultural						0.594***		0.559***
						(0.095)		(0.094)
services						0.818***		0.843***
						(0.121)		(0.122)
manual						0.938***		0.937***
						(0.083)		(0.085)
don't know						0.221		0.254
						(0.728)		(0.728)
Geospatial controls								
Ln pop. index							0.031***	0.032*
							(0.012)	(0.017)
Ln month temp.							0.096	0.029
							(0.084)	(0.108)
Ln slope							-0.050	-0.036
							(0.032)	(0.042)
Ln PPP							0.688***	0.123
							(0.131)	(0.180)
Ln nighlight							-0.013	-0.037
							(0.022)	(0.028)
Ln vegetation							-0.342**	-0.348*
							(0.164)	(0.189)
Ln aridity							1.507***	1.647***
							(0.204)	(0.254)
Constant	0.512	0.405	0.631	0.695	1.655	-2.484*	-8.486***	-7.128***

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Table B.7 (*Continued*): Results: Tobacco use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(1.060)	(1.065)	(1.061)	(1.060)	(1.283)	(1.402)	(1.879)	(2.432)
Observations	76720	76720	76720	76644	76720	25501	76392	25442
Mean dep. var.	0.132	0.132	0.132	0.132	0.132	0.246	0.132	0.246
p-value	3×10^{-61}	1×10^{-65}	3×10^{-59}	2×10^{-58}	2×10^{-50}	3×10^{-11}	1×10^{-78}	6×10^{-9}
Month FE	No	No	No	No	Yes	No	No	No

Notes: Dependent variable: tobacco use. Standard errors in parentheses. Logit regression. State FE are included. DHS national sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table 7 gives the main results. *p<0.1, **p<0.05, ***p<0.01.

Table B.8: Results: Problems accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	-0.141	-0.228	-0.455	-0.048	0.099	-0.325	-0.219	-0.388
	(0.179)	(0.223)	(0.442)	(0.464)	(0.277)	(0.277)	(0.190)	(0.288)
Dem.	-2.304***	-3.026***	-1.297	-1.844*	-2.196***	-2.946**	-1.493***	-2.265**
	(0.663)	(0.816)	(1.016)	(0.982)	(0.684)	(1.191)	(0.578)	(1.076)
Post×Dem.	4.171***	4.054***	4.235**	4.553***	4.255***	1.063	3.178***	0.753
	(0.937)	(1.290)	(1.684)	(1.710)	(0.958)	(2.481)	(0.918)	(1.969)
Individual controls								
Age	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.009**	-0.005**	-0.008**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)
Ln BMI	-0.249***	-0.241**	-0.247***	-0.251***	-0.255***	-0.123	-0.298***	-0.124
	(0.094)	(0.094)	(0.095)	(0.094)	(0.094)	(0.181)	(0.095)	(0.181)
Education								
no	0	0	0	0	0	0	0	0
incomp. prim.	-0.163**	-0.163**	-0.161**	-0.166**	-0.167**	-0.137	-0.146*	-0.127
	(0.076)	(0.076)	(0.076)	(0.076)	(0.075)	(0.188)	(0.076)	(0.190)
comp. prim.	-0.148*	-0.144*	-0.144*	-0.145*	-0.153*	-0.433***	-0.146*	-0.426***
	(0.078)	(0.078)	(0.078)	(0.079)	(0.078)	(0.159)	(0.078)	(0.162)
incomp. sec.	-0.246***	-0.240***	-0.241***	-0.246***	-0.256***	-0.302***	-0.240***	-0.292***
	(0.047)	(0.047)	(0.047)	(0.047)	(0.047)	(0.092)	(0.047)	(0.092)
comp. sec.	-0.404***	-0.397***	-0.400***	-0.404***	-0.417***	-0.543***	-0.403***	-0.517***
	(0.070)	(0.070)	(0.070)	(0.070)	(0.070)	(0.140)	(0.069)	(0.137)
higher	-0.338***	-0.331***	-0.333***	-0.338***	-0.346***	-0.631***	-0.346***	-0.623***
	(0.069)	(0.069)	(0.069)	(0.069)	(0.069)	(0.127)	(0.068)	(0.126)
Urban	-0.518***	-0.509***	-0.520***	-0.518***	-0.477***	-0.477***		
	(0.079)	(0.079)	(0.079)	(0.079)	(0.081)	(0.132)		
Ln altitude	-0.004	-0.000	-0.004	-0.003	-0.010	-0.001	-0.094	-0.064
	(0.046)	(0.046)	(0.046)	(0.046)	(0.052)	(0.083)	(0.065)	(0.114)
Drinks alcohol								
no	0	0	0	0	0	0	0	0
<1/week	0.073	0.076	0.067	0.072	0.071	-0.082	0.052	-0.093
	(0.134)	(0.134)	(0.134)	(0.134)	(0.133)	(0.271)	(0.132)	(0.267)
∼1/week	0.320**	0.332**	0.313**	0.315**	0.322**	0.416	0.286*	0.384
	(0.153)	(0.152)	(0.153)	(0.153)	(0.152)	(0.338)	(0.153)	(0.347)
>1/day	-0.118	-0.084	-0.123	-0.123	-0.119	0.462	-0.143	0.531
	(0.273)	(0.272)	(0.271)	(0.272)	(0.270)	(0.582)	(0.270)	(0.583)
Uses tobacco	0.038	0.040	0.034	0.037	0.038	-0.126	0.009	-0.153
	(0.082)	(0.082)	(0.082)	(0.082)	(0.082)	(0.166)	(0.083)	(0.169)

Continued on next page

Table B.8 (*Continued*): Results: Problems accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Diabetes								
no	0	0	0	0	0	0	0	0
yes	0.390**	0.392**	0.390**	0.385**	0.377**	0.008	0.367**	0.043
	(0.152)	(0.153)	(0.152)	(0.153)	(0.154)	(0.293)	(0.153)	(0.284)
don't know	0.493**	0.494**	0.493**	0.496**	0.471**	0.354	0.485**	0.418
	(0.217)	(0.216)	(0.217)	(0.217)	(0.218)	(0.511)	(0.220)	(0.528)
Bp medicine	-0.163	-0.164	-0.163	-0.163	-0.163	-0.206	-0.173*	-0.222
	(0.100)	(0.100)	(0.100)	(0.100)	(0.100)	(0.198)	(0.102)	(0.191)
Bp told high	0.297***	0.296***	0.297***	0.295***	0.280***	0.303**	0.294***	0.308**
	(0.070)	(0.070)	(0.070)	(0.070)	(0.070)	(0.139)	(0.070)	(0.136)
Wealth status								
poorest	0	0	0	0	0	0	0	0
poorer	-0.335***	-0.337***	-0.318***	-0.326***	-0.325***	-0.501***	-0.324***	-0.510***
	(0.064)	(0.064)	(0.066)	(0.064)	(0.064)	(0.158)	(0.063)	(0.156)
middle	-0.551***	-0.482***	-0.532***	-0.539***	-0.538***	-0.863***	-0.578***	-0.874***
	(0.074)	(0.087)	(0.076)	(0.073)	(0.075)	(0.160)	(0.075)	(0.161)
richer	-0.855***	-0.717***	-0.836***	-0.841***	-0.841***	-1.141***	-0.904***	-1.145***
	(0.086)	(0.113)	(0.088)	(0.086)	(0.087)	(0.192)	(0.087)	(0.180)
richest	-1.108***	-0.971***	-1.089***	-1.093***	-1.095***	-1.392***	-1.143***	-1.387***
	(0.096)	(0.118)	(0.098)	(0.097)	(0.097)	(0.197)	(0.100)	(0.194)
Poor		0.200**						
		(0.088)						
Post×Poor		0.297						
		(0.283)						
Poor×Dem.		1.397*						
		(0.731)						
Post×Poor×Dem.		0.224						
		(1.326)						
Phone			-0.163					
			(0.102)					
Post×Phone			0.333					
			(0.442)					
Phone×Dem.			-1.082					
			(0.971)					
Post×Phone×Dem.			-0.090					
			(1.729)					
Bank				-0.128				
				(0.112)				
Post×Bank				-0.097				
				(0.502)				
Bank×Dem.				-0.495				
				(0.917)				
Post×Bank×Dem.				-0.430				
				(1.739)				
Occupation controls								
no						0		0
prof./tech./manag.						-0.098		-0.090
						(0.187)		(0.191)
clerical						-0.043		-0.102
						(0.546)		(0.493)
sales						-0.087		-0.065

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Table B.8 (*Continued*): Results: Problems accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						(0.320)		(0.320)
agricultural						-0.245*		-0.239*
						(0.146)		(0.145)
services						-0.378*		-0.419**
						(0.197)		(0.204)
manual						-0.156		-0.152
						(0.144)		(0.149)
don't know						0.280		0.277
						(0.425)		(0.425)
Geospatial controls								
Ln pop. index							-0.006	-0.023
							(0.016)	(0.027)
Ln month temp.							-0.256	-0.140
							(0.178)	(0.268)
Ln slope							0.132***	0.180***
							(0.040)	(0.061)
Ln PPP							0.207	0.167
							(0.147)	(0.277)
Ln nighlight							-0.055*	-0.035
							(0.029)	(0.047)
Ln vegetation							0.364	0.141
							(0.229)	(0.405)
Ln aridity							-0.129	0.369
							(0.259)	(0.449)
Ln dist. border							0.074	-0.014
							(0.059)	(0.096)
Ln dist. prot. area							0.023	0.010
							(0.016)	(0.030)
Ln dist. water							-0.084*	-0.062
							(0.045)	(0.078)
Constant	3.850***	3.556***	3.968***	3.972***	4.678***	3.277**	1.108	0.498
	(0.761)	(0.760)	(0.767)	(0.761)	(1.004)	(1.427)	(1.928)	(3.400)
Observations	65057	65057	65057	64985	65057	13838	64763	13813
Mean dep. var.	0.841	0.841	0.841	0.840	0.841	0.840	0.840	0.839
p-value	0.436	0.376	0.643	0.480	0.549	0.177	0.940	0.998
Month FE	No	No	No	No	Yes	No	No	No

Notes: Dependent variable: problems accessing health care. Standard errors in parentheses. Logit regression. State FE are included. DHS national women sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table 8 gives the main results. *p<0.1, **p<0.05, ***p<0.01.

Table B.9: Results: Money as problem accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.219	0.236	-0.559*	-0.195	0.274	0.169	0.146	0.135
	(0.149)	(0.209)	(0.320)	(0.446)	(0.269)	(0.237)	(0.158)	(0.256)
Dem.	1.156***	0.159	2.146***	1.410**	1.827***	1.734**	1.105***	2.040**
	(0.418)	(0.446)	(0.696)	(0.580)	(0.444)	(0.773)	(0.426)	(0.838)
Post×Dem.	1.553*	2.924**	-0.105	0.305	1.314	-1.533	1.425*	-1.604
	(0.803)	(1.466)	(1.334)	(1.434)	(0.818)	(0.995)	(0.829)	(1.045)

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Table B.9 (*Continued*): Results: Money as problem accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Individual controls								
Age	-0.006***	-0.006***	-0.005***	-0.005***	-0.006***	-0.007**	-0.005***	-0.007**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Ln BMI	-0.302***	-0.300***	-0.295***	-0.308***	-0.314***	-0.260	-0.304***	-0.242
	(0.084)	(0.084)	(0.084)	(0.084)	(0.083)	(0.164)	(0.084)	(0.163)
Education								
no	0	0	0	0	0	0	0	0
incomp. prim.	-0.042	-0.041	-0.034	-0.036	-0.047	-0.201	-0.027	-0.167
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.140)	(0.058)	(0.140)
comp. prim.	-0.052	-0.051	-0.042	-0.043	-0.055	-0.015	-0.042	0.002
	(0.060)	(0.060)	(0.059)	(0.060)	(0.060)	(0.129)	(0.060)	(0.129)
incomp. sec.	-0.279***	-0.277***	-0.267***	-0.269***	-0.295***	-0.329***	-0.263***	-0.307***
	(0.035)	(0.035)	(0.035)	(0.035)	(0.035)	(0.074)	(0.035)	(0.076)
comp. sec.	-0.366***	-0.365***	-0.353***	-0.352***	-0.394***	-0.333***	-0.363***	-0.316**
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.124)	(0.058)	(0.127)
higher	-0.470***	-0.468***	-0.458***	-0.457***	-0.487***	-0.319**	-0.465***	-0.302**
	(0.067)	(0.067)	(0.067)	(0.067)	(0.066)	(0.125)	(0.067)	(0.126)
Urban	-0.214***	-0.212***	-0.220***	-0.222***	-0.145**	-0.191		
	(0.069)	(0.069)	(0.069)	(0.069)	(0.069)	(0.127)		
Ln altitude	0.085**	0.087**	0.086**	0.086**	0.160***	0.193***	-0.018	0.098
	(0.035)	(0.035)	(0.035)	(0.035)	(0.041)	(0.067)	(0.049)	(0.088)
Drinks alcohol								
no	0	0	0	0	0	0	0	0
<1/week	-0.032	-0.027	-0.051	-0.038	-0.055	-0.010	-0.025	-0.070
	(0.104)	(0.104)	(0.104)	(0.105)	(0.108)	(0.215)	(0.103)	(0.210)
∼1/week	-0.135	-0.121	-0.156	-0.155	-0.161	-0.389**	-0.134	-0.402**
	(0.100)	(0.099)	(0.099)	(0.100)	(0.100)	(0.182)	(0.100)	(0.192)
>1/day	-0.299*	-0.274	-0.323*	-0.323*	-0.341**	-0.597*	-0.278	-0.578
	(0.177)	(0.175)	(0.171)	(0.173)	(0.174)	(0.356)	(0.175)	(0.355)
Uses tobacco	0.100*	0.102*	0.090	0.098*	0.120**	0.175	0.129**	0.195
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.120)	(0.056)	(0.124)
Diabetes								
no	0	0	0	0	0	0	0	0
yes	0.591***	0.590***	0.591***	0.590***	0.574***	0.379	0.582***	0.389
	(0.119)	(0.119)	(0.120)	(0.120)	(0.120)	(0.254)	(0.119)	(0.255)
don't know	0.330***	0.330***	0.328***	0.332***	0.289**	0.338	0.325***	0.369
	(0.119)	(0.119)	(0.119)	(0.121)	(0.120)	(0.281)	(0.120)	(0.287)
Bp medicine	-0.000	-0.000	0.002	0.002	-0.011	0.071	-0.002	0.069
	(0.074)	(0.074)	(0.074)	(0.074)	(0.074)	(0.152)	(0.075)	(0.154)
Bp told high	0.156***	0.156***	0.158***	0.154***	0.131**	0.075	0.148***	0.061
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)	(0.099)	(0.057)	(0.101)
Wealth status								
poorest	0	0	0	0	0	0	0	0
poorer	-0.391***	-0.392***	-0.358***	-0.366***	-0.358***	-0.441***	-0.394***	-0.456***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.094)	(0.045)	(0.097)
middle	-0.713***	-0.712***	-0.675***	-0.678***	-0.664***	-0.733***	-0.706***	-0.748***
	(0.055)	(0.060)	(0.056)	(0.055)	(0.056)	(0.107)	(0.056)	(0.110)
richer	-0.998***	-0.991***	-0.961***	-0.961***	-0.959***	-0.911***	-0.983***	-0.925***
	(0.068)	(0.086)	(0.068)	(0.068)	(0.068)	(0.135)	(0.069)	(0.139)
richest	-1.552***	-1.541***	-1.515***	-1.515***	-1.539***	-1.685***	-1.530***	-1.729***
	(0.096)	(0.105)	(0.096)	(0.096)	(0.094)	(0.170)	(0.093)	(0.167)
Poor		0.074						

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Table B.9 (*Continued*): Results: Money as problem accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		(0.066)						
Post×Poor		-0.013						
		(0.268)						
Poor×Dem.		1.527***						
		(0.406)						
Post×Poor×Dem.		-2.001						
		(1.583)						
Phone			-0.273***					
			(0.060)					
Post×Phone			0.855**					
			(0.341)					
Phone×Dem.			-1.111*					
			(0.618)					
Post×Phone×Dem.			1.819					
			(1.367)					
Bank				-0.276***				
				(0.066)				
Post×Bank				0.443				
				(0.428)				
Bank×Dem.				-0.210				
				(0.505)				
Post×Bank×Dem.				1.310				
				(1.299)				
Occupation controls								
no						0		0
prof./tech./manag.						-0.279		-0.257
						(0.246)		(0.247)
clerical						-1.546**		-1.573**
						(0.651)		(0.642)
sales						-0.064		-0.073
						(0.342)		(0.336)
agricultural						-0.118		-0.099
						(0.101)		(0.101)
services						0.237		0.214
						(0.193)		(0.192)
manual						0.185*		0.204*
						(0.106)		(0.107)
don't know						0.040		0.069
						(0.371)		(0.369)
Geospatial controls								
Ln pop. index							-0.028**	-0.008
							(0.012)	(0.022)
Ln month temp.							-0.320***	-0.289**
							(0.109)	(0.140)
Ln slope							0.092***	0.094*
							(0.030)	(0.050)
Ln PPP							-0.130	-0.230
							(0.102)	(0.202)
Ln nighlight							0.015	0.027
							(0.020)	(0.035)
Ln vegetation							0.082	0.239

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Table B.9 (*Continued*): Results: Money as problem accessing health care

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							(0.157)	(0.263)
Ln aridity							0.442**	0.383
							(0.192)	(0.326)
Ln dist. border							0.053	0.098
							(0.041)	(0.065)
Ln dist. prot. area							-0.007	0.021
							(0.014)	(0.023)
Ln dist. water							0.059*	0.074
							(0.032)	(0.051)
Constant	2.580***	2.475***	2.728***	2.827***	3.805***	1.828	1.224	-0.810
	(0.655)	(0.662)	(0.657)	(0.650)	(0.770)	(1.301)	(1.460)	(2.502)
Observations	65057	65057	65057	64985	65057	13838	64763	13813
Mean dep. var.	0.339	0.339	0.339	0.339	0.339	0.323	0.339	0.322
p-value	0.136	0.142	0.147	0.160	0.791	0.909	0.240	0.991
Month FE	No	No	No	No	Yes	No	No	No

Notes: Dependent variable: money as problem accessing health care. Standard errors in parentheses. Logit regression. State FE are included. DHS national women sample weights are used. Clustered at DHS PSU and stratified at DHS Strata. Goodness-of-fit p-value according to Archer and Lemeshow (2006). Table 9 gives the main results. *p<0.1, **p<0.05, ***p<0.01.