Financial Concerns and Sleeplessness

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Abstract

Do people worried about their personal finances experience lower quality sleep? Using a regression discontinuity research design, we find that eligible household heads surveyed just after the disbursement of an unconditional cash transfer in Indonesia report a 0.3 standard deviation improvement in sleep quality as compared to those surveyed just before the cash disbursement. The cash transfer appears to have alleviated financial concerns amongst household heads, who are responsible for satisfying the daily necessities of the household. Immediately after disbursement, eligible households report an increase in savings, and eligible household heads report feeling less worried, frustrated, and tired. Consistent with evidence from sleep medicine, eligible household heads displayed improved performance on memory and attention tests but not on reasoning or problem-solving tests. These patterns of results are not observed for household heads ineligible for the cash transfer, which suggests that our results are not driven by seasonal confounders or aggregate shocks. These results are also not observed for other members of eligible households, who are not responsible for satisfying the households' financial needs. We also argue that nutrition, time in bed, and labor supply cannot explain our results.

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1 Introduction

Evidence from public health, sleep medicine, and economics suggests that the poor get less sleep than those with more money. This is not due to a lack of trying but because of poor sleep quality: the poor experience difficulty falling asleep and staying asleep (Grandner et al. 2010; Patel et al. 2010). In the US, lower-income individuals spend 8 hours in bed but sleep for only 5.5 hours, while higher-income individuals spend 7.5 hours in bed and sleep for 6.5 hours; lower-income individuals experience longer sleep latency (time to sleep onset) and lower sleep efficiency (sleep per time in bed) compared to people with higher incomes (Lauderdale et al. 2006). Similarly, the urban poor in India sleep for only 5.5 hours, despite spending 8 hours in bed, due to frequent awakenings during the night (Bessone et al. 2021; Rao et al. 2021).

Because sleep is an important input for attention, memory, and health (Killgore 2010; Lim and Dinges 2008; Banks and Dinges 2007), there is concern in the popular press and scientific community about a negative feedback loop where mental burdens associated with poverty, such as anxiety and worries, create reasons to toss and turn, which in turn keeps the poor poor (Resnick 2015; Ellison 2021). However, there exists no evidence for a causal relationship between financial concerns and sleeplessness, a precondition to the existence of any such tragic spiral.

Estimation of this relationship is complicated for two reasons. One, although data sets frequently measure time in bed, they do not measure sleep quality. Two, economic conditions are typically endogenous. Furthermore, even if economic conditions are exogenous, it is difficult to parse the effects of mental burdens from the effects of material deprivations like hunger.

In this paper, we leverage a unique natural experiment in Indonesia to solve these complications: a nationwide household survey collected detailed sleep quality data – coincidentally – just before rapid disbursement of cash via an unconditional transfer program for some eligible households and just after the cash infusion for other – plausibly comparable – eligible households. This set up allows us to use a regression discontinuity design to compare outcomes between eligible households surveyed immediately before and after the cash disbursement, potentially isolating the effects of the immediate reduction in financial concerns that are unconfounded by the effects of the more gradual improvements in material conditions.

Beginning November 17, 2014, Indonesia rapidly disbursed cash equal to IDR 400,000 (roughly USD 30) to eligible households as part of an unconditional cash transfer program called the Bantuan Langsung Sementara Masyarakat (BLSM).[1] Coincidentally, the transfer took place in the middle of the administration of a nationwide household survey, the Indonesian Family Life Survey (IFLS 5). The IFLS 5 collected detailed sleep quality data – via a ten-item questionnaire from the Patient Reported Outcomes Measurement Information System (PROMIS) – for the past 7 days for all household members over 15 years of age. The PROMIS sleep items have been validated against other well-known sleep indices as well as objective actigraphy sleep measures. We use all ten items to construct an aggregate measure of sleep quality: the sleep disturbance and impairment (SDI) index. In our analysis, we examine impacts on this aggregate index, as well as on each of its component parts.

Using a regression discontinuity research design, we find likely eligible (cardholders) household heads surveyed just after the start of the BLSM cash transfer disbursement, November 17, 2014, reported significantly better sleep quality (0.3 standard deviations), compared to likely eligible (cardholders) household heads surveyed just before the start of the cash disbursement.[2] Household heads surveyed just after the cash transfer disbursement were significantly less likely to report that they 'had difficulty falling asleep' or 'had trouble sleeping'. Furthermore, these effects are observed across demographic subgroups of household heads, irrespective of their age or gender.

Improvement in sleep quality is not driven by differences in characteristics of households surveyed on either side of the cash disbursement: households surveyed before and after cash transfer disbursement were similar on numerous socioeconomic indicators.[3] Our results are also not driven by seasonal confounders (e.g., temperature) or aggregate shocks (e.g., fuel subsidies): we find no difference in sleep quality after the cash transfer disbursement for heads of households

[1]The poorest 25 per cent of Indonesian households were eligible to receive this one-time cash transfer. Eligible households would have to use their social protection cards (Kartu Perlindungan Sosial, KPS, Kartu Keluarga Sejahtera, KKS, or Kartu Simpanan Keluarga Sejahtera, KSKS) to prove their eligibility, and retrieve their BLSM transfers at the nearest post office (The World Bank 2017). In our sample, before the BLSM transfer rollout, IDR 400,000 represented roughly 25 percent of monthly expenditures for the median recipient household.

[2]Because ownership of social protection cards proves eligibility for BLSM as well as other social assistance programs, we can only identify households *likely* eligible to receive the BLSM transfer.

[3]Importantly, for the validity of our research design, we also fail to find evidence that households surveyed just after the BLSM cash transfer disbursement were more or less likely to hold any social protection cards compared to households surveyed just before the cash disbursement.

ineligible (non-cardholders) for the cash transfer program.

Importantly, we also fail to find evidence of improved sleep quality for other members of cardholder households. Unlike household heads, other members of the household are unlikely to be responsible for household finances: in the IFLS, the household head is identified by members of the household as the individual *'responsible for satisfying daily necessities of the household or regarded/assigned as the head of the household'*. We hypothesize that the cash infusion relived financial worries amongst cardholder household heads, improving their sleep quality. Such an explanation would be consistent with evidence from psychology, public health, and sleep medicine that shows that financial strain is a significant correlate of both sleep onset and sleep continuity (Hall et al. 2008, 2009; Perales and Plage 2017; Zheng et al. 2012; Warth et al. 2009). In fact, in a survey of over 2,000 adults in the U.S. in 2022, 87% of respondents say that they have 'lost sleep' due to worries about finances (The American Academy of Sleep Medicine 2022).

To test this hypothesis, we explore how cardholder households' expenditures, borrowings, and savings respond to the unconditional cash transfer. We find that cardholder households surveyed just after the BLSM cash disbursement report an increase in contributions to local savings groups in the last month as well as an increase in total savings (28%).[4] This suggests that the cash infusion helped shore up their financial positions, and improved their ability to handle potential emergencies that require immediate access to cash (e.g. illness). The cash disbursement could thus reduce cardholder household heads' feelings of vulnerability and anxiety, improving their sleep quality. Experimental evidence from India and survey evidence from the U.S. shows that workers feel more financially secure immediately after wages are paid out (Kaur et al. 2022; Pew Charitable Trusts 2016). Such an explanation is also consistent with sleep survey results from a representative sample of U.S. adults: respondents who rated their sleep as excellent are nearly two times more likely to regularly save for retirement or unforeseen medical expenses compared to those who rated their sleep as poor (The Better Sleep Council 2019). Indeed, we find that cardholder

[4]The absolute value of this percentage increase in total savings is just over IDR 100,000, precisely the magnitude of the first stage estimate of the effect of the start of the cash transfer disbursement on BLSM transfer amounts for cardholder households. This suggests that recipient households did not use the BLSM transfer to improve their material conditions – e.g., purchase food or sleeping aids – immediately after the cash transfer disbursement. To confirm this, we directly evaluate and fail to find evidence for increase in food and non-food expenditures or the value of other assets.

household heads, but not other members of cardholder households, were significantly less likely to report feeling worried after the cash transfer disbursement. Cardholder household heads were also significantly less likely to report feeling frustrated and tired after the cash transfer disbursement. Overall, our results are consistent with the explanation that reduced financial concerns – likely through psychological channels – improved sleep quality.

We rule our several alternative explanations. For instance, it is unlikely that changes in material possessions like communal sleeping aids (e.g. electric fans) are responsible for our results, unless these or similar personal sleeping aids (e.g. a personal bed) were purchased solely for the consumption of the household head. We also fail to find any direct evidence of any sleeping aid purchases after the cash transfer. Such an explanation is also inconsistent with Bessone et al. (2021) who conducted a randomized controlled trial with poor adults in India and showed that sleeping aids increased time in bed but had no effect on sleep efficiency. Our results are also unlikely to be driven by changes in nutrition unless, again, only the household head experienced changes in nutrition. To confirm this, we examine household food consumption in the past week and fail to find evidence for an increase or decrease in food consumption for cardholder households surveyed after the cash transfer disbursement. We also fail to observe any changes in the frequency of meals consumed by cardholder household heads. Finally, it is unlikely that changes in time use for cardholder household heads after the cash disbursement explain our results. There is no evidence for changes in work hours in the past week for cardholder household heads which suggests that longer or shorter work hours are not responsible for our results; nor do we find evidence for earlier bedtimes or later wake-up times which suggests improvement in sleep quality is not due to increased time in bed or changes in their sleeping schedules. In fact, because cardholder household heads were less likely to report that they 'had difficulty falling asleep' or 'had trouble sleeping', the null effect for time in bed suggests that time asleep increased as well.

Lastly, we show that cardholder household heads' tested after the cash transfer disbursement displayed improved memory performance (0.2 standard deviations). We also find that cardholder household heads surveyed after the cash transfer disbursement were more likely to be assessed by surveyors as having excellent attention during the survey administration. However, we fail to find

evidence for improvement in mathematical problem-solving or reasoning performance. We also fail to find evidence for improvements in memory performance or attentiveness for non-cardholder household heads as well as for other members of cardholder households. These results are consistent with evidence from sleep medicine that emphasizes the impacts of sleep on attention and memory rather than reasoning and problem solving, which are relatively unaffected by sleep deprivation (Lim and Dinges 2008; Killgore 2010; Lim and Dinges 2010; Killgore and Weber 2014). These results are also consistent with responses to the sleep-related impairment index items: cardholder household heads surveyed just after the cash transfer disbursement were significantly less likely to report that they 'had a hard time concentrating because of poor sleep' or that they 'felt irritable because of poor sleep'.[5]

This paper contributes to the growing literature on the psychological impacts of economic conditions (Haushofer and Fehr 2014; Schilbach, Schofield and Mullainathan 2016). Studies have focused on effects on happiness or mental health (Ridley et al. 2020; Haushofer and Shapiro 2016, 2018), cognition and decision-making (Mullainathan and Shafir 2013; Mani et al. 2013; Shah, Shafir and Mullainathan 2015; Carvalho, Meier and Wang 2016; Bartos et al. 2018; Ong, Theseira and Ng 2019; Fehr, Fink and Jack 2022; Lichand and Mani 2019),[6] children's test scores (Duquennois 2022), human capital investments (Lichand et al. 2021), and worker productivity (Kaur et al. 2022).

Our work provides the first evidence for the psychological impacts of economic conditions on the quality of sleep – the single largest use of time. We know extremely little about why the poor underinvest in potentially high-return sleep (Rao et al. 2021). Is it due to the unrelenting work schedules set by employers in the informal sector, where the poor are overwhelmingly employed? Or is it because the poor underestimate the value of sleep and/or that they do not have the necessary information to overcome sleep barriers, like college students in the U.S. (Avery, Giuntella and Jiao 2022)? Or perhaps because the returns to time in bed are lower for the poor since they have to spend more time in bed than the rich to get the same amount of sleep due to the lower quality

[5]However, as we discuss below, because a growing literature in economics suggests that the psychological impacts of economic conditions can have a direct effect on cognitive function, it is possible that improvement in sleep quality only partially explains the effect on memory and attention.

[6]Carvalho, Meier and Wang (2016) is an exception in that they fail to find evidence that financial strain impedes cognitive function and decision-making among low-income individuals in the US.

of their sleep (Bessone et al. 2021), which may not even be within their control? Consistent with the last explanation, our results suggest that investment in sleep should not solely be viewed as a consequence of choice, and is at least partially driven by the psychological impacts of financial concerns on sleep quality.[7]

This paper also contributes to the literature that examines the impacts of sleep deprivation. An enormous body of research, almost exclusively from rich countries, shows that sleep deprivation is negatively associated with mental health (Scott et al. 2021), attention, memory, and physical health (Killgore 2010; Lim and Dinges 2008; Banks and Dinges 2007), children's test scores (Carrell, Maghakian and West 2011), and worker productivity (Gibson and Shrader 2018). However, similar evidence from low-income countries is extremely limited (Bessone et al. 2021; Jagnani 2022). In fact, Bessone et al. (2021) conducted a field experiment with low-income adults in India that provided information, encouragement, and improvements to home sleep environments. This increased sleep duration by 27 minutes a night by inducing more time in bed, but had no detectable effects on cognition, productivity, decision making, or well being. They speculate that low-quality sleep in their setting may not offer the same marginal benefits as the sleep typically available in higher-income contexts, and underline the need to test interventions that target sleep quality in similar lower-income settings (Rao et al. 2021). Our results suggest that their conjecture is well founded: we present the first evidence that improving sleep quality enhances cognitive functions sensitive to sleep duration amongst lower-income adults in developing countries.

2 Context and Data

To examine the causal effect of financial concerns on sleep quality, we exploit the rapid dissemination of an unconditional cash transfer program in Indonesia starting November, 17, 2014, in the middle of the rollout of a nationwide household survey that collected detailed sleep quality data.

[7]Of course, we do not have data on time asleep or sleep efficiency. However, our results that the cash transfer disbursement decreased the likelihood that cardholder household heads 'had difficulty falling asleep' or 'had trouble sleeping', but had no impact on time in bed, suggest that time asleep and sleep efficiency improved as well. Additionally, we detect significant improvement in cognitive indicators associated with sleep deprivation, but not for cognitive measures that are relatively unaffected by sleep deprivation.

2.1 Bantuan Langsung Sementara Masyarakat (BLSM)

Over the past decade, Indonesia has incrementally reduced existing fuel subsidies and compensated the poorest 25 percent of households for the subsequent rise in fuel, food, and transport prices through an unconditional cash transfer program, the Bantuan Langsung Sementara Masyarakat (BLSM).[8]

In this paper, we study the BLSM transfers that followed the reduction of fuel subsidies on November 17, 2014. On November 3, in anticipation of the reduction in fuel subsidies, President Joko Jokowi Widodo launched new social protection cards, Kartu Keluarga Sejahtera (KKS) and Kartu Simpanan Keluarga Sejahtera (KSKS), to expand and eventually replace the existing social protection card, Kartu Perlindungan Sosial (KPS). The new cards were delivered to eligible households via the national postal service after their poverty status was verified by the national registry. Once the reduction in fuel subsidies was announced, eligible households would be able to use their old or new social protection cards (KPS, KKS, or KSKS) to prove their eligibility, and retrieve their BLSM transfers at the nearest post office (The World Bank 2017; Stefanie 2014).

On Monday, November 17, 2014, President Jokowi raised subsidized gasoline prices by around 30 percent and diesel prices by around 36 percent, effective immediately (Shaffer 2014).[9] Concurrently, eligible cardholders received IDR 400,000 (roughly USD 30) (The World Bank 2017), about 25 percent of the monthly expenditures for the median recipient household.

[8]While BLSM-targeted households consume little fuel directly, fuel price increases can be passed on to other economic sectors, especially food and transport, which account for significant shares of expenditure. For instance, the average fuel prices in June 2013 increased by 33 percent following reduction in existing fuel subsidies, which for an average poor or near-poor household were valued at slightly less than 10 percent of total consumption expenditure. Therefore, as compensation, the BLSM program transferred cash amounts to the poorest quarter of households' budget equal to roughly 11 percent of their regular expenditures (The World Bank 2017).

[9]However, soon after, due to falling world oil prices, the Indonesian government decreased fuel prices on two separate occasions in January such that by January 19, 2015, gasoline and diesel prices were only 1.5% and 16%, respectively, above the levels on November 16, 2014. Correspondingly, inflation rate increased from 4.83% in October 2014 to 6.23% in November and 8.36% in December, before decreasing to 6.96% in January 2015. Overall, in this instance, the reduction in fuel subsidies was not accompanied by substantial price increases, and economic growth in the fourth quarter of 2014 or in the first quarter of 2015 was not significantly affected (Bank Indonesia 2015; International Institute for Sustainable Development 2015).

2.2 The Indonesian Family Life Survey (IFLS)

Importantly, for our research design, the November 2014 transfers coincided with the administration of the fifth survey wave of the Indonesian Family Life Survey (IFLS 5). The IFLS is a longitudinal data set that includes five waves of detailed household surveys conducted by the RAND Corporation (a US-based non-profit) between 1993 and 2015. It covers 13 of the 27 provinces that existed in Indonesia in 1993, and is representative of 83% of the population. The IFLS 5 was administered to 15,185 households composed of 55,935 individuals between September 2014 (week 35) and April 2015 (week 70). Figure 1 plots the temporal distribution of all the IFLS 5 household surveys by week. Administration of the survey started on August 25 and was in full swing by November 17 (week 47), the start of the BLSM transfer disbursement. Furthermore, a simple eyeball test suggests that there was no discontinuous increase or decrease in the frequency of household surveys at the start of the cash transfer disbursement.

Sleep quality and time-in-bed data. The IFLS 5 includes detailed data on sleep quality for the past 7 days for all household members over 15 years of age. That is, the IFLS 5 includes a sleep questionnaire that incorporates 10 items from the Patient Reported Outcomes Measurement Information System (PROMIS): 5 items each from the sleep disturbance and sleep-related impairment item banks, respectively. The PROMIS sleep items have been carefully developed and evaluated against other well-known sleep indices such as the Pittsburgh Sleep Quality Index and the Epworth Sleepiness Scale (Yu et al. 2012; Buysse et al. 2010; Cella et al. 2010). Importantly, they have also been validated against objective actigraphy sleep measures like sleep latency and sleep efficiency (Giordano et al. 2022; Hanish, Lin-Dyken and Han 2017; Sletten et al. 2018). We use all ten items to construct an aggregate measure of sleep quality: the sleep disturbance and impairment (SDI) index. In our analysis, we examine impacts on this aggregate index, as well as on its component parts. The IFLS 5 also includes data on bedtime and wake-up time for the day prior to the survey for every member of the household, which allows us to infer time spent in bed.[10]

[10]While time use data collected by the IFLS 5 is limited, respondents are asked about hours worked in the past week.

Raw correlation with socioeconomic status at baseline. Figure 2, Panels (a) and (b) show that higher socioeconomic status individuals – as measured by total household assets before the cash transfer disbursement – spend less time in bed but experience better sleep quality, consistent with data collected via actigraphy monitoring devices from higher- and lower-income individuals in the US and India (Lauderdale et al. 2006; Bessone et al. 2021). Furthermore, although time in bed for both household heads and other household members is equally sensitive to socioeconomic status, household heads spend less time in bed across the socioeconomic spectrum as compared to other household members (Figure 2, Panel (c)). Interestingly, household heads' quality of sleep is much more sensitive to socioeconomic status as compared to other members of the household (Figure 2, Panel (d)): we observe a strong positive correlation between socioeconomic status and sleep quality for household heads; however, the correlation between socioeconomic status and sleep quality for other household members is not as pronounced. Overall, these raw data suggest that household heads face unique money-related constraints that impede the quality of their sleep.

Expenditure, affect, and cognition data. In addition to these sleep data, the IFLS 5 collected detailed household data on food consumption in the past 7 days, including information on the frequency of meals consumed by household members, expenditures on recurring non-food items during the past month, expenditures on sporadic non-food items during the past year, and the current value of assets and liabilities.

The survey also collected, for all household members over 15 years of age, data on three positive (happiness, contentment, enthusiasm) and nine negative (worries, frustration, sadness, stress, pain, bored, loneliness, anger, tiredness) affects for the previous day, and on mental health for the past 7 days via the Center for Epidemiological Studies' ten-item depression scale (CES-D).

The IFLS 5 also includes several different measures of cognition for all household members over 15 years of age: performance on eight Raven's Matrices and a six-item block-adaptive number series test (reasoning), performance on five mathematical questions (problem solving), and the ability to recall a list of ten words twice – once immediately after hearing them, and then once more after the administration of a separate portion of the questionnaire (memory). Lastly, the IFLS 5 also

recorded surveyors' assessment of all respondents' attentiveness during the survey. These data were recorded twice, once after the first questionnaire, which takes about an hour, and includes the 12-item affect module, and then once again after the second questionnaire, which takes another hour, and includes the 10-item sleep module.

BLSM transfers data. The survey also collected detailed information on BLSM transfers, including month of receipt, frequency, and amount of transfers. Information on whether the household has any of the social protection (SP) cards required to claim BLSM transfers is also recorded. Unfortunately, because ownership of social protection cards proves eligibility for BLSM as well as other social assistance programs, we can only identify households *likely* eligible to receive BLSM transfers. Nonetheless, together these data allow us to i) identify the precise month households report receipt of BLSM transfers, ii) verify that households that do not have social protection cards (ineligible households) did not receive BLSM transfers, and critically, iii) identify households who have social protection cards and are thus likely eligible for the BLSM transfer even though they were interviewed prior to the transfer disbursement date.

3 Research Design: Fuzzy Regression Discontinuity

Figure 3 plots the likelihood of BLSM transfer receipt and the mean BLSM transfer amounts received in Fall 2014 by interview week. As one might expect, we find that few likely eligible households (cardholders) interviewed prior to November 17 (week 47), the beginning of the BLSM transfer disbursement, reported receipt of a BLSM transfer. This was followed by a sharp and continuous increase in BLSM transfer receipt in the subsequent two weeks amongst cardholder households. This trend stabilized by December 7 with roughly half of the cardholder households reporting receipt of a BLSM transfer. In that week, the average cardholder household reported BLSM transfers totalling roughly IDR 200,000. Overall, 81 percent of recipient households reported transfers of IDR 400,000 (about USD 30), representing roughly 25 percent of the median monthly expenditures for cardholder households interviewed prior to the transfer disbursement. The average BLSM transfer amount amongst recipients was roughly IDR 380,000. Reassuringly, less than 1 percent of ineligible

households (non-cardholders) reported receipt of a BLSM transfer before or after November 17, 2014.

To examine the causal effects of financial concerns on sleep quality, we use a fuzzy regression discontinuity design that leverages the sharp increase in the likelihood of BLSM transfers on or after November 17, 2014 (week 47):

$$Y_{ihekw} = \gamma_0 + \gamma_1 \mathbf{1}(Week_{ihek} \geq T) + \gamma_2 (Week_{ihek} - T) + \\ + \gamma_3 (Week_{ihek} - T) * \mathbf{1}(Week_{ihek} \geq T) + \boldsymbol{\theta} \mathbf{X_{ihek}} + + \rho_k + \nu_{ihekw} \tag{1}$$

Y_{ihekw} is the outcome of interest (sleep quality, affects, cognitive measures) for individual i in household h in enumeration area e in kabupaten (district) k in survey week w. Our outcomes of interest also include household-level expenditures, assets, and liabilities. $Week_{ihek}$ indicates the week in which individual- and household-level outcomes were recorded,[11] while T is the treatment threshold (week 47). Figure A1 shows the density of the survey week distribution is continuous across the treatment threshold; the McCrary test statistic for cardholder household heads is -0.05 (s.e. 0.07) (McCrary 2008). We include a vector of individual or household characteristics, $\mathbf{X_{ihek}}$, as controls, although excluding these controls does not alter our results appreciably. Specifically, we control for age and gender for individual-level outcomes and household size and composition for household-level outcomes.[12] ρ_k are kabupaten fixed effects. Thus, the RD estimates compare outcomes for individuals or households within the same district but surveyed on either side of the treatment threshold. Standard errors are clustered at the enumeration area level.

Analysis sample. Our analysis sample includes 18,759 individuals from 7,909 households. Of these 1,815 households have a social protection card (likely eligible households), while 6,094 do not have a social protection card (ineligible households). Therefore, at the individual level, our

[11] The individual- and household-level outcomes were recorded via health and household surveys, respectively, which were administered in the same week for almost all households. For the few households where these surveys were administered in different weeks, $Week_{ihek}$ indicates the health survey week for individual-level outcomes and the household survey week for household-level outcomes.

[12] That is, for household-level outcomes, we include controls for total number of household members, number of household members under 16 years of age, number of household members over 65 years of age, number of female household members, and the gender of the household head.

sample includes 1,815 cardholder and 6,094 non-cardholder household heads. The corresponding numbers for other members of the household are 2,778 and 8,072, respectively. To construct this analysis sample we impose four sample restrictions. First, we restrict the sample to households where the household head answered the 10-item questionnaire on sleep quality. Second, we only include households where the household survey was conducted within 12 weeks before or after November 17, 2014 – the beginning of the BLSM transfer disbursement. Third, we restrict the sample to households where the household head was also interviewed within 12 weeks before or after November 17, 2014. Fourth, we only include household members interviewed within 12 weeks before or after November 17, 2014. We impose these restrictions to compare the same set of households, household heads, and other household members across different outcomes of interest. Furthermore, in robustness checks, we show that our results are insensitive to these sample restrictions.

Balance tests. The underlying assumption of our research design is that households surveyed on or just after week 47 are, on average, similar to households surveyed just before week 47. To test this assumption, we examine survey non-response and ownership of social protection cards based on interview date, and whether households surveyed on either side of the cutoff are similar on observable socioeconomic indicators (Table 1). First, we fail to find evidence for non-response to the sleep questionnaire based on interview date. We show that household heads surveyed just after the cutoff are no more or less likely to have responded to the 10-item sleep quality questionnaire than household surveyed just before the cutoff.[13] Second, we show that households surveyed just after the cutoff are no more or less likely to have a social protection card than household surveyed just before the cutoff. Third, both cardholder and non-cardholder households surveyed just after the cutoff are no more or less likely to have access to other social protection programs. Fourth, cardholder and non-cardholder households, household heads, and other members of the household, surveyed on either side of the cutoff have similar socioeconomic characteristics. We observe slight imbalance in household composition for non-cardholder households. However, the p-value of the

[13]Similarly, other members of the household surveyed just after the cutoff are no more or less likely to have responded to the 10-item sleep quality questionnaire than other members surveyed just before the cutoff.

joint F-test is 0.49 between non-cardholder households surveyed on either side of the cutoff.

Summary statistics. Table 1 also presents the baseline (pre-transfer) summary statistics for households and household members. The 23% of households that have a social protection card are poorer – as indicated by land value and ownership – than the rest of the sample who do not have a social protection card. This is consistent with the design of the BLSM program which targets the poorest 25 percent of Indonesian households. Lastly, looking towards household members, household heads are older and less likely to be female than other members of the household.

4 Results: Impacts of Cash Transfer Disbursement

4.1 First Stage: Transfer Likelihood and Amount

Figure 4 shows the graphical representation of the first stage result. Panel (a) shows the change in likelihood of BLSM transfer receipt at the treatment threshold separately for likely eligible (cardholder) and ineligible (non-cardholder) households; Panel (b) shows the discontinuity in BLSM transfer amounts at the treatment threshold separately for cardholder and non-cardholder households. We observe a large and statistically significant increase in receipt of BLSM transfers at the start of the transfer disbursement, November 17, 2014, for cardholder households. Table 2 shows the corresponding point estimates. Cardholder households surveyed on or just after week 47 are 27 percentage points more likely to report any BLSM transfer receipt. Furthermore, cardholder households surveyed on or just after week 47 report BLSM transfers of just over IDR 100,000 on average. We find extremely small effects – both visually and statistically – for non-cardholder households: few non-cardholder households reported receipt of BLSM transfers before or after the treatment threshold.

4.2 Impacts on Sleep Quality for Household Heads

Figure 5 plots sleep quality – as measured by the aggregate SDI index – before and after the BLSM cash transfer disbursement separately for cardholder and non-cardholder household heads. Non-

cardholder (richer) household heads have better sleep quality than cardholder (poorer) household heads before the cash transfer disbursement. This baseline pattern was disrupted by a sharp increase in cardholder household heads' sleep quality following the start of the cash transfer disbursement, with no corresponding change in sleep quality for non-cardholder household heads. That is, cardholder household heads surveyed on or just after week 47 reported significantly improved sleep quality, compared to cardholder household heads surveyed just before week 47. However, the slope of the line capturing cardholder household heads' sleep quality after the cash transfer disbursement suggests that the improvement in sleep quality was short-lived.[14] Consistent with the sharp increase in cash transfer receipt in the first three weeks following the cash transfer disbursement, the improvement in sleep quality was immediate and dramatic, with cardholder household heads briefly enjoying better sleep quality than even non-cardholder household heads. However, sleep quality for cardholder household heads returned to baseline levels roughly three months after the start of the cash transfer disbursement.

Table 3 presents the corresponding reduced form point estimate of 0.3 standard deviations (SDs) for cardholder household heads.[15] Because these effects are not observed for non-cardholder household heads, it is unlikely that our results are driven by seasonal confounders (e.g. changes in temperature). The lack of effects for non-cardholder household heads also suggests that the reduction in fuel subsidies, also announced in week 47, or other aggregate shocks, do not confound the impact of cash transfer disbursement on sleep quality for cardholder household heads.[16] Indeed, we can also reject that the point estimate for cardholder household heads is statistically the same as the point estimate for non-cardholder household heads (p-value = 0.004).

Next, we show that reported improvement in sleep quality for cardholder household heads, and the corresponding lack of effect for non-cardholder household heads, is observed for both the sleep disturbance and sleep-related impairment indices (Table 4).

[14] It is important to note that, like with any regression discontinuity research design, we cannot attach a causal interpretation to patterns of results away from the treatment threshold (week 47).

[15] Our regression discontinuity estimates are robust to a quadratic specification (Figure A2 and Table A1). They are also unaffected by choice of bandwidth (Figure A3). Finally, they are insensitive to the relaxation of sample restrictions described in Section 3 (Table A2).

[16] In any case, negative aggregate shocks like inflation, due to reduction in fuel subsidies, would bias our results downwards.

Sleep disturbance index. Cardholder household heads surveyed on or just after week 47 reported a statistically significant 0.25 SDs decrease in their aggregate sleep disturbance scores (Table 4, Panel (a)). Improvement in sleep disturbance for cardholder household heads is observed for each of the five items that together constitute the sleep disturbance index (Table 4, Panel (b)). However, the signal is statistically strongest for two of these items: household heads surveyed just after the cash transfer disbursement were significantly less likely to report that they 'had difficulty falling asleep' and 'had trouble sleeping'. This is consistent with actigraphy data from the US and India that shows that the poor have difficulty falling asleep and staying asleep (Lauderdale et al. 2006; Bessone et al. 2021). We fail to find these effects for non-cardholder household heads. The point estimate is small, positive, and statistically insignificant. In fact, we can reject that the point estimate for the aggregate disturbance index for cardholder household heads is statistically similar to the point estimate for non-cardholder household heads (p-value = 0.004).

Sleep-related impairment index. Similarly, cardholder household heads surveyed on or just after week 47 reported a statistically significant 0.29 SDs decrease in their aggregate sleep-related impairment scores (Table 4, Panel (a)). Improvement in sleep-related impairment for cardholder household heads is observed for each of the five items that together constitute the sleep-related impairment index (Table 4, Panel (b)). Here, the signal is statistically strongest for four of these items: cardholder household heads surveyed just after the cash transfer disbursement were significantly less likely to report that they 'had a hard time concentrating because of poor sleep', 'had problems during the day because of poor sleep', 'felt tired', and 'felt irritable because of poor sleep'. We fail to find these effects for non-cardholder household heads. The point estimates are close to zero and statistically insignificant. We can also reject that the point estimate for the aggregate impairment index for cardholder household heads is statistically similar to the point estimate for non-cardholder household heads (p-value = 0.023). Overall, while we directly evaluate effects on household heads' cognition using both objective measures as well as surveyors' assessments below, these self-reported results strongly suggest that improvement in cardholder household heads' sleep quality had a positive impact on their attention in ways that were meaningful to the respondents.

4.3 Mechanisms: Psychological Impacts of Financial Concerns

In this section, we argue that improvement in sleep quality for cardholder household heads is at least partly due to the psychological impacts of reduced financial concerns following the cash transfer disbursement. First, we show that improvement in sleep quality amongst cardholder household heads is observed across demographic subgroups, irrespective of age or gender. Second, we fail to find evidence of improvement in sleep quality for other members of cardholder households, who, unlike household heads, are not responsible for household finances. Third, we show that immediately after the cash transfer disbursement, cardholder households report an increase in total savings. Fourth, we show that cardholder household heads report feeling less worried, frustrated, and tired after the cash transfer disbursement. Finally, we fail to find evidence for alternative explanations such as the purchase of sleeping aids, and changes in nutrition or time use.

Sleep quality improved across demographic subgroups of cardholder household heads. We find the improvement in sleep quality amongst cardholder household heads is observed across demographic subgroups, irrespective of age or gender, which suggests that the effects for household heads are not driven by gender- or age-specific physiological, societal, or cultural factors (Table 5, Panel (b)). The point estimate for female household heads is similar to that for male household heads; however, it is noisier likely due to the smaller number of female headed households in our sample. Household heads under 40 years of age and household heads over 65 years of age are also less common generating imprecise, but non-trivial, point estimates of -0.28 and -0.17 SDs, respectively. We also fail to reject that the point estimates differ across household head age groups (p-value = 0.674) and across household head gender (p-value = 0.834).

No improvement in sleep quality for other members of cardholder households. Importantly, we fail to find evidence of improvement in sleep quality for other members of cardholder households (Table 5, Panel (c)); the point estimate is smaller, positive, and statistically insignificant. We can also reject equality of the point estimates between cardholder household heads and other members of cardholder households (p-value = 0.000). Furthermore, for almost all demographic subgroups

discussed above, we can also reject equality of the point estimates between cardholder household heads and other members of cardholder households that share the same demographic characteristics (p-values $\in$ [0.012, 0.093]). The only demographic subgroup where we are underpowered to reject equality of the point estimates between cardholder household heads and other members of cardholder households is household members over 65 years of age (p-value = 0.223).

These results are consistent with raw data presented in Figure 2, and discussed in Section 2.2, which suggests that as compared to household heads, the correlation between socioeconomic status and sleep quality is much weaker for other members of the household. That is, household heads may face unique money-related constraints that impede the quality of their sleep.

In the IFLS, the household head is identified by members of the household as the individual *'responsible for satisfying daily necessities of the household or regarded/assigned as the head of the household'*. Therefore, it may be that the cash infusion relived financial concerns amongst cardholder household heads, improving their sleep quality. Such an explanation is also consistent with evidence from psychology, public health, and sleep medicine that shows that financial strain is a significant correlate of both sleep onset and sleep continuity (Hall et al. 2008, 2009; Perales and Plage 2017; Zheng et al. 2012; Warth et al. 2009). In fact, in a survey of over 2,000 adults in the U.S. in 2022, 87% of respondents say that they have 'lost sleep' due to worries about finances (The American Academy of Sleep Medicine 2022).

Savings increased amongst cardholder households. To explore this hypothesis, we examine how cardholder households' savings and borrowings respond to the cash transfer disbursement (Table 6). We find that cardholder households surveyed just after the cash transfer disbursement report a statistically significant 13% increase in contributions to local savings groups (Arisans) in the last month. Cardholder households also report a statistically significant 28% increase in total savings just after the cash transfer disbursement.[17] Interestingly, the absolute value of this percentage increase in total savings is just over IDR 100,000, precisely the magnitude of the first stage estimate of the effect of the start of the cash transfer disbursement on BLSM transfer amounts for cardholder

[17]We do not find a statistically significant increase in either regular transfers in the last month, including debt repayment, or irregular transfers in the last year, although the coefficients are positive. Similarly, we find a statistically insignificant decrease in the reported value of outstanding loans.

households. This suggests that recipient households did not use the BLSM transfer to improve their material conditions – e.g., purchase food or sleeping aids – immediately after the cash transfer disbursement. To confirm this, below, we directly evaluate and fail to find evidence for increase in food and non-food expenditures or the value of other assets. Lastly, consistent with the pattern of results for sleep quality, these effects are not observed for non-cardholder households; the point estimates are much smaller and statistically insignificant.[18]

Overall, these results suggest that the cash infusion helped shore up the financial positions of cardholder households, and improved their ability to handle potential emergencies that require immediate access to cash to address (e.g., illness). Therefore, the cash disbursement could have reduced cardholder household heads' feelings of vulnerability and anxiety, thereby improving their sleep quality. Experimental evidence from India and survey evidence from the U.S. shows that workers feel more financially secure immediately after wages are paid out (Kaur et al. 2022; Pew Charitable Trusts 2016). Such an explanation is also consistent with sleep survey results from a representative sample of U.S. adults: respondents who rated their sleep as excellent are nearly two times more likely to regularly save for retirement or unforeseen medical expenses compared to those who rated their sleep as poor (The Better Sleep Council 2019).

Worries decreased amongst cardholder household heads. To provide direct evidence on the role played by psychological factors associated with financial concerns, we examine the effects of the cash transfer disbursement on affects (Table 7).

We find that cardholder household heads surveyed just after the cash transfer disbursement were 9 percentage points (42.9%) less likely to report feeling more than a little worried compared to cardholder household heads surveyed just before the cash transfer. This result is consistent with a large literature in psychology and sleep medicine on the association between worries and difficulty falling asleep, poorer sleep quality, and shorter sleep duration, in both clinical and non-clinical samples (Harvey, Tang and Browning 2005; Harvey 2005; Clancy et al. 2020; Pillai and Drake 2015). Furthermore, we find small, positive, and statistically insignificant effects for worries for

[18]However, we cannot reject statistical equality between point estimates for cardholder and non-cardholder households for either contributions to local savings groups (p-value = 0.276) or total savings (p-value = 0.223).

non-cardholder household heads as well as other members of cardholder households. We can reject statistical equality between the point estimates for cardholder and non-cardholder household heads (p-value = 0.010) and between cardholder household heads and other members of cardholder households (p-value = 0.024).

We also find that cardholder household heads surveyed after the cash transfer disbursement were 5 and 9 percentage points less likely to report feeling more than a little frustrated (41.7%) and tired (19.6%), respectively. The effect on tiredness for cardholder household heads is in line with the decrease in reports of 'feeling tired' as part of the sleep-related impairment index. Moreover, the effect on frustration is consistent with evidence in psychology that suggests that frustration is a predictor of poor sleep quality (Niemiec et al. 2020; Uysal and Ascigil 2022; Balter, Sundelin and Axelsson 2021). Like for worries, we also find null effects for frustration and tiredness for non-cardholder household heads as well as other members of cardholder households after the cash transfer disbursement. The effects are much smaller and statistically insignificant. We can also reject statistical equality between the point estimates for these groups for frustration (p-values $\in$ [0.048, 0.064]). Insofar as tiredness is concerned, we can reject that the point estimates between cardholder household heads and other members of cardholder households are statistically the same (p-value = 0.010); however, we are slightly underpowered to reject statistical equality between the point estimates for cardholder and non-cardholder household heads (p-value = 0.108).

We fail to find statistically significant impacts for stress, anger, happiness, sadness, enthusiasm, contentment, boredom, loneliness or pain amongst cardholder household heads. The point estimates for enthusiasm, contentment, happiness, and anger are close to zero. The coefficients for sadness, stress, and pain are negative, as one might expect, but quantitatively much smaller than the coefficient for worries.[19] The point estimates for loneliness and boredom are positive.[20]

Lastly, we examine effects on mental health for the past 7 days as measured by the CES-D ten-item depression scale (Table A3). We find that cardholder household heads surveyed just after the cash transfer disbursement have better mental health compared to cardholder household

[19]We can reject that the point estimate for stress is statistically the same as the point estimate for worries (p-value = 0.016). However, we cannot reject that the point estimates for sadness (p-value = 0.110) and pain (p-value = 0.318) are statistically the same as the coefficient for worries.

[20]We can reject that these coefficients are statistically the same as the estimate for worries (p-values $\in$ [0.001, 0.010].

heads surveyed just before the cash transfer (-0.14 SDs). However, the point estimate is statistically insignificant.[21]

Overall, our pattern of results are consistent with the explanation that improvement in sleep quality for cardholder household heads is at least partly driven by the psychological impacts of reduced financial concerns following the cash transfer disbursement. It is important to note that we cannot, and neither is it our aim, to isolate any particular psychological mechanism; several – including worries, stress, or sadness – may involuntarily interfere with sleep quality.

Alternative explanations. The concentration of our estimates amongst cardholder household heads, with null effects for non-cardholder household heads as well as for other members of cardholder households, rules out alternative explanations that would influence both non-cardholder and cardholder households (e.g. temperature) and channels that would likely impact multiple members of cardholder households (e.g. sleeping aids like electric fans). In this section, we discuss whether changes in physical circumstances that are specific to the cardholder household heads could plausibly explain our finding of improved sleep quality immediately after the cash transfer disbursement. We also argue that demand effects (response bias) cannot explain our results.

Sleeping aids. It is unlikely that changes in material possessions like communal sleeping aids (e.g., mosquito repellents, electric fans) are responsible for our results, unless, perhaps implausibly, these or similar personal sleeping devices (e.g. personal beds or bed sheets) were purchased solely for the consumption of household heads. We also fail to find direct evidence for purchase of any sleeping aids: we do not find evidence that cardholder households report increased values in asset categories that include sleeping aids such as mosquito repellents, beds, bed sheets, or electrical appliances after the cash transfer disbursement (Table A4);[22] nor do we find evidence that cardholder households increased expenditure on electricity or fuel in the last month, which

[21] We find positive (worse mental health) and significant effects for non-cardholder household heads. We can also reject that the point estimates between cardholder and non-cardholder household heads for CES-D depression index is statistically the same (p-value = 0.020). The point estimate for other members of cardholder households is closer to zero and statistically insignificant.

[22] The fact that the improvement in sleep quality for cardholder household heads was short-lived, as discussed earlier, also indicates that purchase of sleeping aids is unlikely to explain our results.

could have potentially powered sleeping aids like electric fans and air conditioners.[23] Such an explanation is also inconsistent with Bessone et al. (2021) who conducted a randomized controlled trial with poor adults in India and showed that sleeping devices (e.g., pillow, bed, blanket, ear plugs) increased time in bed but had no effect on sleep efficiency.

Nutrition. Our results are also unlikely to be driven by changes in food consumption amongst cardholder households unless, again, only the household head experienced these changes, which seems improbable. Nevertheless, we can test for changes in a number of both household and individual nutrition indicators. There is no evidence of an increase or decrease in the value of food consumed in the past week by cardholder households after the cash transfer disbursement (Table A6). We also fail to find evidence that cardholder households owned more livestock or poultry after the cash transfer disbursement, nor is there any evidence of changes in the frequency of meals consumed in the past week by cardholder household heads after the cash transfer. Lastly, household heads were not more or less likely to report having 'adequate food consumption' after the cash transfer disbursement.

Time use. We also rule out changes in time use as an explanation for our results (Table A7). We fail to find evidence for changes in bedtimes or wake-up times for cardholder household heads which suggests that improvement in sleep quality is not due to (i) increase or decrease in time in bed or (ii) changes in sleeping schedule. In fact, because cardholder household heads were less likely to report 'difficulty falling asleep' or 'trouble sleeping' after the cash transfer disbursement, the null effects for time in bed suggests that time asleep and sleep efficiency improved as well. This result also suggests that there were no dramatic shifts in work schedule for cardholder household heads (e.g., working nights). We also fail to find evidence for changes in total work hours for cardholder households heads in the past week which suggests longer or shorter work hours are not responsible for our results.

[23] We also fail to find evidence for an increase in other monthly non-food expenditures, other annual expenditures, or other household assets amongst cardholder households after the cash transfer. (Table A5).

Demand effects. It is extremely unlikely that our results are driven by demand characteristics or hawthorne effects. First, the IFLS is a longitudinal survey conducted by the RAND Corporation, a US-based non-profit, and not the Indonesian government. Second, there was no mention of BLSM transfers before the survey was administered. Third, we find no effects on affects that would likely be impacted by demand characteristics (e.g., happiness). Finally, as we discuss below, we detect improvement for objective as well as surveyor-measured cognitive indicators sensitive to sleep deprivation.

4.4 Impacts on Cognitive Performance

In the final part of the paper, we examine whether following improvements in sleep quality, cardholder household heads tested just after the cash transfer disbursement had better cognitive performance compared to cardholder household heads tested just before the cash transfer disbursement (Table 8).

We find that cardholder household heads tested just after the cash transfer disbursement performed better on memory tests, as measured by rapid and delayed word recall (0.20 SDs) (Table 8, Panel (a)). We fail to find evidence for an improvement in mathematical problem solving, as captured by math questions, or reasoning performance, as elicited by Raven's Matrices and the number series test. The point estimates are small, negative, and statistically insignificant. We can also reject statistical equality between the point estimates for memory tests, and mathematical problem-solving or reasoning tests (p-values $\in$ [0.013, 0.058]). Finally, we find that cardholder household heads' surveyed after the cash transfer disbursement were 7 percentage points (23.09%) more likely to be assessed by surveyors as having excellent attention during the survey (Table 8, Panel (b)). This effect is only observed for the second attentiveness assessment, about two hours into the survey after the second questionnaire, and not the first assessment, which was conducted an hour into the survey after the first questionnaire.[24] This pattern of results is exactly what one would expect if sleep were the mechanism of impact: evidence from lab experiments shows that

[24]The point estimate for the first attentiveness assessment is smaller and statistically insignificant. However, we are slightly underpowered to reject that the point estimate on the first assessment is statistically equal to the point estimate on the second assessment (p-value = 0.108).

the decline in attention across the duration of a task is exacerbated by sleep deprivation (Lim and Dinges 2008; Hudson, Van Dongen and Honn 2020).

It is important to note that the 10-item sleep questions are part of the second questionnaire. Therefore, it may be that attentiveness ratings on the second assessment are biased upwards because the same surveyor who rates a respondent's attentiveness was just told by the respondent how impaired due to poor sleep they felt. However, such an explanation is unlikely to be responsible for our attentiveness results. The 12-item affect questions which inquire about frustration, worries, and tiredness were part of the first questionnaire. It seems implausible that surveyors' assessments were biased by respondent's answers to the sleep questions, but not by the responses to the affect questions. Nevertheless, we cannot rule out such an explanation completely.

Finally, consistent with our results for sleep quality, savings, and worries, we fail to find evidence for improvement in memory performance or attentiveness assessment for non-cardholder household heads or other members of cardholder households. The point estimates are much smaller and statistically insignificant. We can also statistically reject that the point estimates for memory performance are the same for cardholder household heads and non-cardholder household heads (p-values $\in$ [0.022, 0.048]). However, we are underpowered to reject statistical equality between point estimates for cardholder household heads and other members of cardholder households (p-values $\in$ [0.177, 0.191]).[25] Similarly, while we can reject that the point estimates for the second attentiveness assessment for cardholder and non-cardholder household heads are statistically the same (p-value = 0.026), we cannot reject statistical equality between point estimates for the second attentiveness assessment between cardholder household heads and other members of cardholder households (p-value = 0.270).

These pattern of results are entirely consistent with evidence from sleep medicine that emphasizes the impacts of sleep loss on attention and memory rather than reasoning and problem solving, which are relatively unaffected by sleep deprivation (Lim and Dinges 2008; Killgore 2010; Lim and Dinges 2010; Killgore and Weber 2014). Overall, our results suggest that improvement in sleep quality enhances cognitive functions sensitive to sleep duration.

[25] We are better powered to reject statistical equality between these point estimates if we drop sample restrictions discussed in Section 3 (p-values $\in$ [0.076, 0.101]) (Table A2).

It is important to note, however, that a growing literature in economics suggests that the psychological impacts of economic conditions can have a direct effect on cognitive function. For instance, Kaur et al. (2022) stagger when wages are paid out in a sample of low-income Indian piece-rate manufacturing workers to show that financial concerns lower productivity due to reduced attention. Therefore, we cannot completely rule out that sleep quality only partially explains the improvement in memory performance and attention.[26]

5 Conclusion

Why do the poor underinvest in potentially high-return sleep? Our results suggest that investment in sleep should not solely be viewed as a consequence of choice, and is at least partially driven by the psychological impacts of financial concerns on sleep quality.

Using a regression discontinuity research design, we find cardholder household heads surveyed just after the disbursement of an unconditional cash transfer program in Indonesia report better sleep quality (0.3 SDs) compared to cardholder household heads surveyed just before the cash transfer disbursement; they were less likely to report that they had difficulty falling asleep or had trouble sleeping. It is likely that the cash transfer relived financial concerns among household heads, who are responsible for satisfying daily necessities of the household, improving their sleep quality: cardholder households report an increase in contributions to local savings groups as well as greater total savings; cardholder household heads were less likely to report feeling worried, frustrated, and tired. Finally, consistent with evidence from sleep medicine, cardholder household heads displayed improved performance on memory and attention tests but not on reasoning or problem-solving tests. These patterns of results are not observed for household heads ineligible for the cash transfer program (non-cardholders) which suggests that our results are not driven by seasonal confounders or aggregate shocks. These results are also not observed for other members

[26]There is also evidence that the psychological impacts of poor economic conditions diminish performance on cognitive measures relatively unaffected by sleep deprivation – for example, reasoning performance, as elicited by Raven's Matrices (Mani et al. 2013). Because reasoning performance – also elicited by Raven's Matrices – is unaffected in our paper, evidence from this literature may also be interpreted as bolstering our claim that sleep quality is at least partially responsible for the improvement in memory performance and attention.

of cardholder households, who unlike household heads, are not designated as the individual responsible for satisfying household necessities. We also rule out changes in nutrition, time in bed, or labor supply, or the purchase of sleep aids as explanations for our results.

Our results open up multiple new directions for future research. First, our results highlight the need to test psychological interventions like cognitive behavioral therapy to improve sleep quality amongst the poor (Bhat et al. 2022). Second, future studies might design field experiments that examine the importance of sleep quality as a mechanism for the psychological impacts of financial conditions on real world economic outcomes. Third, the longer-run psychological impacts of economic conditions on various dimensions of sleep deserve further investigation.

References

Avery, Mallory, Osea Giuntella, and Peiran Jiao. 2022. "Why Don't We Sleep Enough? A Field Experiment Among College Students." The Review of Economics and Statistics.

Balter, Leonie J. T., Tina Sundelin, and John Axelsson. 2021. "Sickness and sleep health predict frustration and affective responses to a frustrating trigger." Scientific Reports, 11.

Bank Indonesia. 2015. "Inflation Data." https://www.bi.go.id/en/default.aspx.

Banks, Siobhan, and David Dinges. 2007. "Behavioral and Physiological Consequences of Sleep Restriction." Journal of Clinical Sleep Medicine, 3: 519–528.

Bartos, Vojtech, Michal Bauer, Julie Chytilová, and Ian Levely. 2018. "Effects of poverty on impatience: Preferences or inattention?" Mimeo.

Bessone, Pedro, Gautam Rao, Frank Schilbach, Heather Schofield, and Mattie Toma. 2021. "The economic consequences of increasing sleep among the urban poor." The Quarterly Journal of Economics, 136(3): 1887–1941.

Bhat, Bhargav, Jonathan de Quidt, Johannes Haushofer, Vikram Patel, Gautam Rao, Frank Schilbach, and Pierre-Luc Vautrey. 2022. "The Long-Run Effects of Psychotherapy on Depression, Beliefs, and Economic Outcomes." Mimeo.

Buysse, Daniel J., Lan Yu, Douglas E. Moul, Anne Germain, Angela Stover, Nathan E. Dodds, Kelly L. Johnston, Melissa A. Shablesky-Cade, and Paul A. Pilkonis. 2010. "Development and validation of patient-reported outcome measures for sleep disturbance and sleep-related impairments." Sleep, 33(6): 781–792.

Carrell, Scott E, Teny Maghakian, and James E West. 2011. "A's from Zzzz's? The Causal Effect of School Start Time on the Academic Achievement of Adolescents." American Economic Journal: Economic Policy, 3(3): 62–81.

Carvalho, Leandro S., Stephan Meier, and Stephanie W. Wang. 2016. "Poverty and economic decision-making: Evidence from changes in financial resources at payday." American Economic Review, 106(2): 260–284.

Cella, David, William Riley, Arthur Stone, Nan Rothrock, Bryce Reeve, Susan Yount, Dagmar Amtmann, Rita Bode, Daniel Buysse, Seung Choi, Karon Cook, Robert DeVellis, Darren

DeWalt, James F. Fries, Richard Gershon, Elizabeth A. Hahn, Jin-Shei Lai, Paul Pilkonis, Dennis Revicki, Matthias Rose, Kevin Weinfurt, and Ron Hays. 2010. "Initial Adult Health Item Banks and First Wave Testing of the Patient-Reported Outcomes Measurement Information System (PROMIS™) Network: 2005–2008." Journal of Clinical Epidemiology, 63(11): 1179–94.

Clancy, F., A. Prestwich, L. Caperon, A. Tsipa, and D. B. O'Connor. 2020. "The association between worry and rumination with sleep in non-clinical populations: a systematic review and meta-analysis." Health Psychology Review, 14(4): 427–448.

Duquennois, Claire. 2022. "Fictional money, real costs: Impacts of financial salience on disadvantaged students." American Economic Review, 112(3): 798–826.

Ellison, Katherine. 2021. "The sleep gap: If you're wealthy, you probably get plenty. If you're poor or a minority, you may not, research finds." The Washington Post.

Fehr, Dietmar, Guenther Fink, and Kelsey Jack. 2022. "Poor and rational: Decisionmaking under scarcity." The Journal of Political Economy.

Gibson, Matthew, and Jeffrey Shrader. 2018. "Time Use and Productivity: The Wage Returns to Sleep." The Review of Economics and Statistics, 100(5): 783–798.

Giordano, Nicholas A., Alexandra Kane, Ramiro Rodriguez, Diane Papay, Bryanna Canales, Keri F. Kirk, Chester C. Buckenmaier III, and Krista B. Highland. 2022. "Changes in actigraphy metrics associated with PROMIS measures after orthopaedic surgery." International Journal of Nursing Practice.

Grandner, Michael A., Nirav P. Patel, Philip R. Gehrman, Dawei Xie, Daohang Sha, Terri Weaver, and Nalaka Gooneratne. 2010. "Who gets the best sleep? Ethnic and socioeconomic factors related to sleep complaints." Sleep Medicine, 11(5): 470–478.

Hall, Martica, Daniel J. Buysse, Eric A. Nofzinger, Charles F. Reynolds III, Wesley Thompson, Sati Mazumdar, and Timothy H. Monk. 2008. "Financial strain is a significant correlate of sleep continuity disturbances in late-life." Biological Psychology, 77(2): 217–222.

Hall, Martica H., Karen A. Matthews, Howard M. Kravitz, Ellen B. Gold, Daniel J. Buysse, Joyce T. Bromberger, Jane F. Owens, and MaryFran Sowers. 2009. "Race and Financial Strain are Independent Correlates of Sleep in Midlife Women: The SWAN Sleep Study." Sleep, 32(1): 73–82.

Hanish, Alyson E., Deborah C. Lin-Dyken, and Joan C. Han. 2017. "PROMIS Sleep Disturbance and Sleep-Related Impairment in Adolescents: Examining Psychometrics Using Self-Report and Actigraphy." Nursing Research, 66(3): 246–251.

Harvey, Allison G. 2005. "A Cognitive Theory and Therapy for Chronic Insomnia." Journal of Cognitive Psychotherapy: An International Quarterly, 19(1): 41–59.

Harvey, Allison G., Nicole K.Y. Tang, and Lindsay Browning. 2005. "Cognitive approaches to insomnia." Health Psychology Review, 25(5): 593–611.

Haushofer, Johannes, and Ernst Fehr. 2014. "On the psychology of poverty." Science, 344(6186): 862–867.

Haushofer, Johannes, and Jeremy Shapiro. 2016. "The Short-Term Impact of Unconditional Cash Transfers to the Poor: Experimental Evidence from Kenya." The Quarterly Journal of Economics, 131(4): 1973–2042.

Haushofer, Johannes, and Jeremy Shapiro. 2018. "The Long-Term Impact of Unconditional Cash Transfers to the Poor: Experimental Evidence from Kenya." Mimeo.

Hudson, Amanda N., Hans P. A. Van Dongen, and Kimberly A. Honn. 2020. "Sleep deprivation, vigilant attention, and brain function: a review." Neuropsychopharmacology, 45: 21–30.

International Institute for Sustainable Development. 2015. "Fossil-fuel Subsidy Reform and Higher Fuel Prices in Indonesia: Impacts and expectations."

Jagnani, Maulik. 2022. "Children's sleep and human capital production." The Review of Economics and Statistics.

Kaur, Supreet, Sendhil Mullainathan, Suanna Oh, and Frank Schilbach. 2022. "Do financial concerns make workers less productive." The Quarterly Journal of Economics.

Killgore, William D S. 2010. "Effects of sleep deprivation on cognition." Progress in Brain Research, 185: 105–129.

Killgore, William D. S., and Mareen Weber. 2014. "Sleep Deprivation and Cognitive Performance." In: Bianchi, M. (eds) Sleep Deprivation and Disease. Springer, New York, NY., 209–229.

Lauderdale, Diane S., Kristen L. Knutson, Lijing L. Yan, Paul J. Rathouz, Stephen B. Hulley, Steve Sidney, and Kiang Liu. 2006. "Objectively Measured Sleep Characteristics among Early-

Middle-Aged Adults: The CARDIA Study." American Journal of Epidemiology, 164: 5–16.

Lichand, G., and A. Mani. 2019. "Insurance against cognitive droughts." Mimeo.

Lichand, Guilherme, Eric Bettinger, Nina Cunha, and Ricardo Madeira. 2021. "The Psychological Effects of Poverty on Investments in Children's Human Capital." Mimeo.

Lim, Julian, and David F. Dinges. 2008. "Sleep deprivation and vigilant attention." Annals of the New York Academy of Sciences, 1129: 305–322.

Lim, Julian, and David F. Dinges. 2010. "A meta-analysis of the impact of short-term sleep deprivation on cognitive variables." Psychological Bulletin, 136(3): 375–389.

Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao. 2013. "Poverty impedes cognitive function." Science, 341(6149): 976–980.

McCrary, Justin. 2008. "Manipulation of the running variable in the regression discontinuity design: A density test." Journal of Econometrics, 142(2): 698–714.

Mullainathan, Sendhil, and Eldar Shafir. 2013. "Scarcity: Why having too little means so much."

Niemiec, Christopher P., Anja H. Olafsen, Hallgeir Halvari, and Geoffrey C. Williams. 2020. "Losing sleep over work: A self-determination theory view on need frustration, sleep disturbance, and mental ill health." Stress and Health, 38(4): 790–803.

Ong, Qiyan, Walter Theseira, and Irene Y. H. Ng. 2019. "Reducing debt improves psychological functioning and changes decision-making in the poor." Proceedings of the National Academy of Sciences, 116(15): 7244–7249.

Patel, Nirav P., Michael A. Grandner, Dawei Xie, Charles C. Branas, and Nalaka Gooneratne. 2010. "Sleep disparity in the population: Poor sleep quality is strongly associated with poverty and ethnicity." BMC Public Health, 10(475).

Perales, Francisco, and Stefanie Plage. 2017. "Losing ground, losing sleep: Local economic conditions, economic vulnerability, and sleep." Sleep, 62: 189–203.

Pew Charitable Trusts. 2016. "Barriers to Saving and Policy Opportunities: The Role of Emergency Savings in Family Financial Security." Technical Report.

Pillai, Vivek, and Christopher L. Drake. 2015. "Chapter 10 - Sleep and Repetitive Thought: The Role of Rumination and Worry in Sleep Disturbance." Sleep and Affect: Assessment, Theory, and

Clinical Implications, 201–225.

Rao, Gautam, Susan Redline, Frank Schilbach, Heather Schofield, and Mattie Toma. 2021. "Informing Sleep Policy through Field Experiments." Science, 6567: 530–533.

Resnick, Brian. 2015. "The Racial Inequality of Sleep." The Atlantic.

Ridley, Matthew, Gautam Rao, Frank Schilbach, and Vikram Patel. 2020. "Poverty, Depression, and Anxiety: Causal Evidence and Mechanisms." Science, 370(6522).

Schilbach, Frank, Heather Schofield, and Sendhil Mullainathan. 2016. "The psychological lives of the poor." American Economic Review Papers and Proceedings, 106(5): 435–440.

Scott, Alexander J., Thomas L. Webb, Marrissa Martyn-St James, Georgina Rowse, and Scott Weich. 2021. "Improving sleep quality leads to better mental health: A meta-analysis of randomised controlled trials." Sleep Medicine Reviews, 60(101556).

Shaffer, Leslie. 2014. "Indonesia's fuel hike may put kibosh on 'fragile' tag." CNBC.

Shah, Anuj K., Eldar Shafir, and Sendhil Mullainathan. 2015. "Scarcity frames value." Psychological Science, 26(4): 402–412.

Sletten, Tracey L., Michelle Magee, Jade M. Murray, Christopher J. Gordon, Nicole Lovato, David J. Kennaway, Stella M. Gwini, Delwyn J. Bartlett, Steven W. Lockley, Leon C. Lack, Ronald R. Grunstein, and Shantha M. W. Rajaratnam. 2018. "Efficacy of melatonin with behavioural sleep-wake scheduling for delayed sleep-wake phase disorder: A double-blind, randomised clinical trial." PLOS Medicine, 15(6).

Stefanie, Christie. 2014. "PDIP Has Appointed Spokesperson for Jokowi's Sakti Card." CNN Indonesia.

The American Academy of Sleep Medicine. 2022. "Sleep Prioritization Survey: Losing Sleep to Finance Worries."

The Better Sleep Council. 2019. "Survey: Top Factors That Impact Americans' Quality of Sleep."

The World Bank. 2017. "Towards a comprehensive, integrated, and effective social assistance system in Indonesia."

Uysal, Ahmet, Aykutoglu Bulent, and Esra Ascigil. 2022. "Basic psychological need frustration and health: Prospective associations with sleep quality and cholesterol." Motivation and Emotion,

44: 209–225.

Warth, Jacqueline, Marie-Therese Puth, Judith Tillmann, Johannes Porz, Ulrike Zier, Klaus Weckbecker, and Eva Münster. 2009. "Over-indebtedness and its association with sleep and sleep medication use." BMC Public Health, 19.

Yu, Lan, Daniel J. Buysse, Anne Germain, Douglas E. Moul, Angela Stover, Nathan E. Dodds, Kelly L. Johnston, and Paul A. Pilkonis. 2012. "Development of short forms from the PROMIS™ sleep disturbance and sleep-related impairment item banks." Behavioral Sleep Medicine, 10(1): 6–24.

Zheng, Huiyong, MaryFran Sowers, Daniel J. Buysse, Flavia Consens, Howard M. Kravitz, Karen A. Matthews, Jane F. Owens, Ellen B. Gold, and Martica Hall. 2012. "Sources of Variability in Epidemiological Studies of Sleep Using Repeated Nights of In-Home Polysomnography: SWAN Sleep Study." Journal of Clinical Sleep Medicine, 8(1).

Tables and Figures

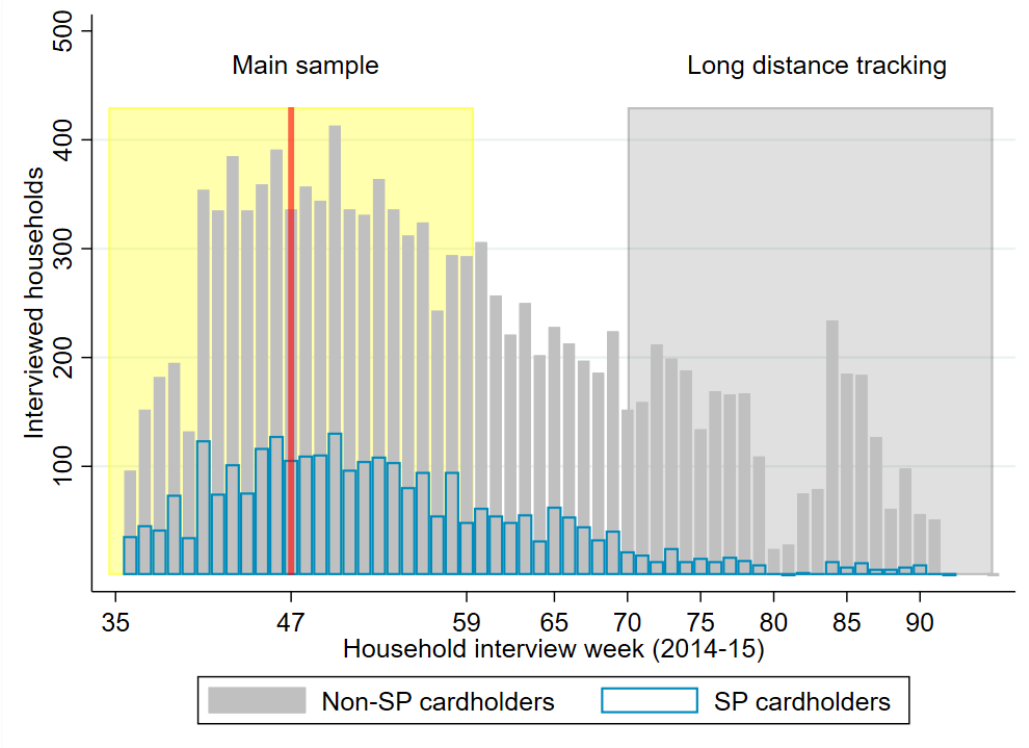
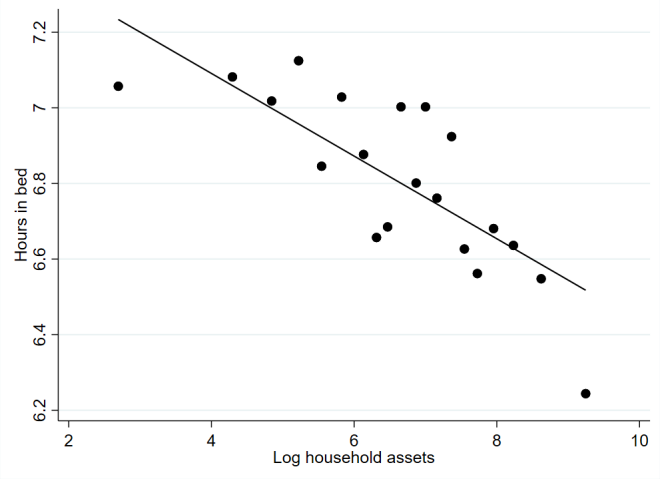
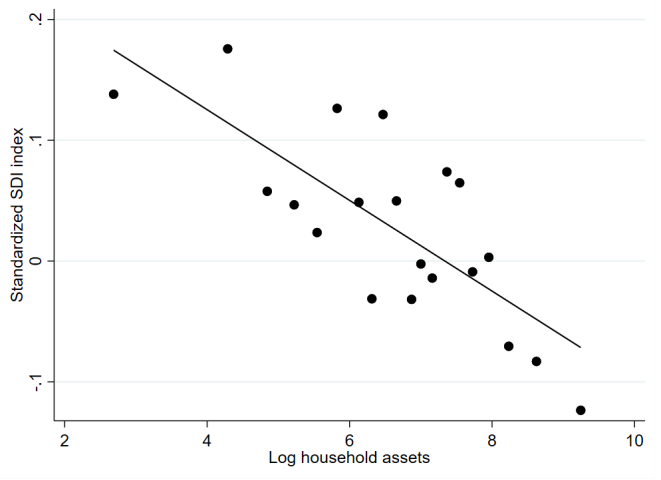


Figure 1. Temporal distribution of all the IFLS 5 household surveys by week

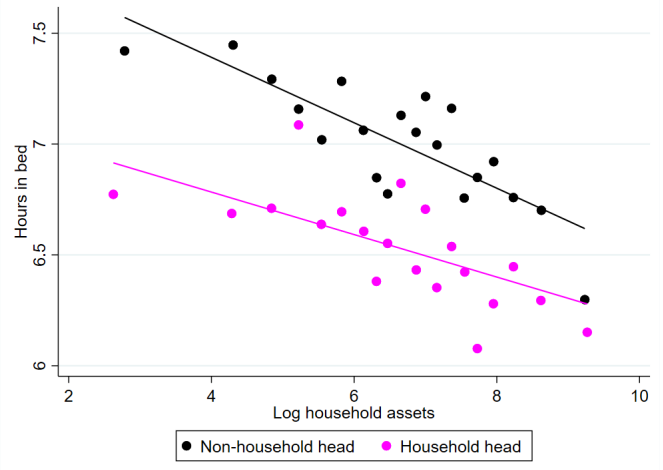
Notes: The histogram shows the number of social protection (SP) cardholder (in blue) and non-SP cardholder households (in grey) interviewed each week during the survey period. The main survey was administered between October 2014 and April 2015, followed by long distance tracking of households that had moved more than a 45 minute trip from their original enumeration area. Weeks are numbered relative to the 1st week of 2014. The red line marks week 47, the beginning of BLSM cash transfer disbursement. Our analysis sample, highlighted in yellow, runs from weeks 35 and 59, spanning from 12 weeks before to 12 weeks after the mid-November BLSM transfer.



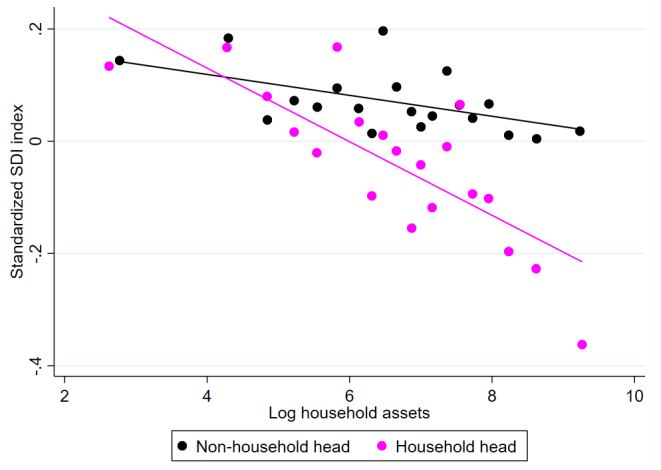
(a) Hours in bed



(b) Sleep disturbance and impairment (Standardized SDI index)



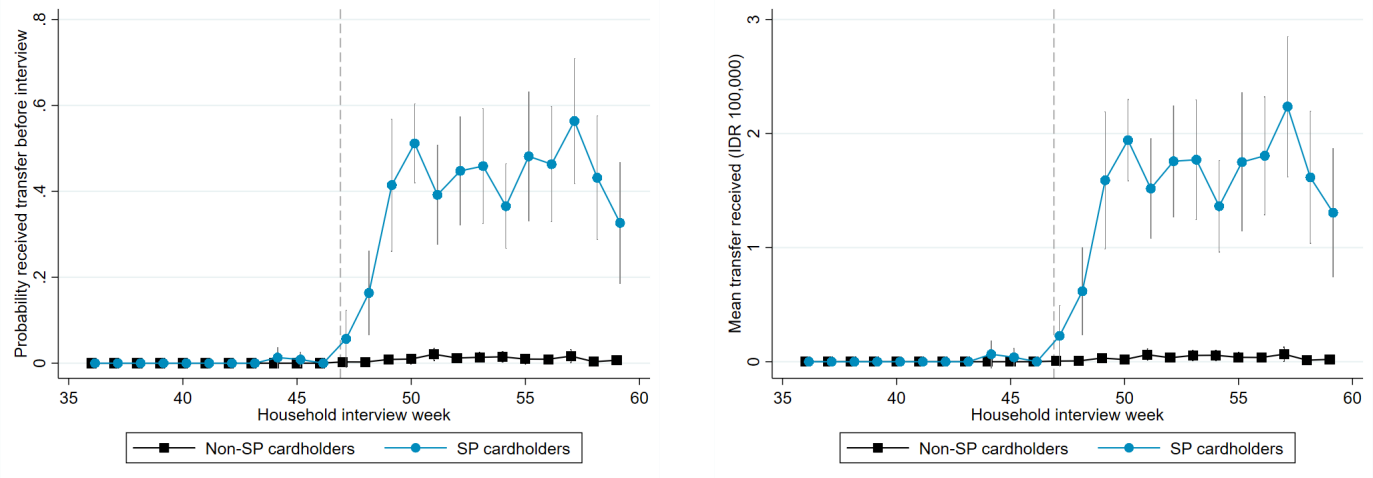
(c) Hours in bed



(d) Sleep disturbance and impairment (Standardized SDI index)

Figure 2. Standardized SDI index and time in bed (in hours) by socioeconomic status – as measured by log total household assets before the cash transfer disbursement – for household heads and other members of households

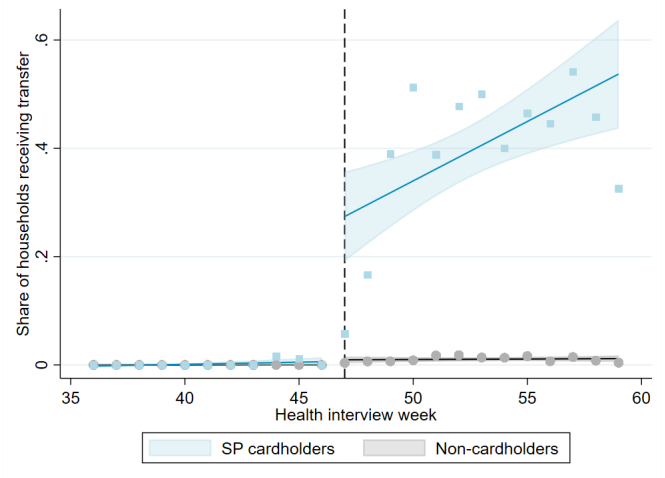
Notes: All panels use data from individuals in the analysis sample who were interviewed prior to the cash transfer disbursement. Log household assets is calculated as $log(Y+1)$ with Y as the sum of all assets reported in the household asset questionnaire (IDR 100,000). Panels (a) and (c) show hours spent in bed, as calculated using the time respondents woke up and went to sleep yesterday. Figures (b) and (d) show the standardized aggregate sleep disturbance and impairment (SDI) index.



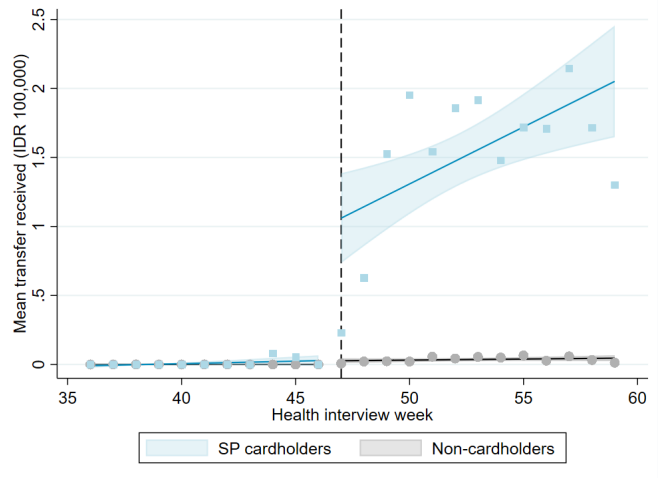
(a) Likelihood of BLSM transfer receipt (0/1) **(b) BLSM transfer amounts (IDR 100,000)**

Figure 3. Rapid increase in likelihood and amount of BLSM transfers for cardholder households, but not for non-cardholder households, from week 47, the start of BLSM cash transfer disbursement

Notes: Panel (a) plots the probability a household reports receipt of a BLSM transfer in the months of October, November or December 2014 by week. Panel (b) plots the mean amount households report receiving in BLSM transfers by week. Cardholder households are plotted in blue and non-cardholder households are plotted in black. 95% confidence intervals are plotted with standard errors are clustered at the enumeration area level. The dashed line indicates week 47, the start of BLSM cash transfer disbursement (November 17, 2014).



(a) Regression discontinuity estimate for likelihood of BLSM transfer receipt (0/1)



(b) Regression discontinuity estimate for BLSM transfer amounts (IDR 100,000)

Figure 4. Sharp increase in likelihood and amount of BLSM transfers for cardholder households, but not for non-cardholder households, at the treatment threshold, week 47, the start of BLSM cash transfer disbursement

Notes: Panel (a) plots the probability a household reports receipt of a BLSM transfer before and after the treatment threshold, week 47, the start of the BLSM cash transfer disbursement. Panel (b) plots the mean amount households report receiving in BLSM transfers before and after the treatment threshold. Cardholder households are plotted in blue and non-cardholder households are plotted in gray. 95% confidence intervals are plotted with standard errors are clustered at the enumeration area level.

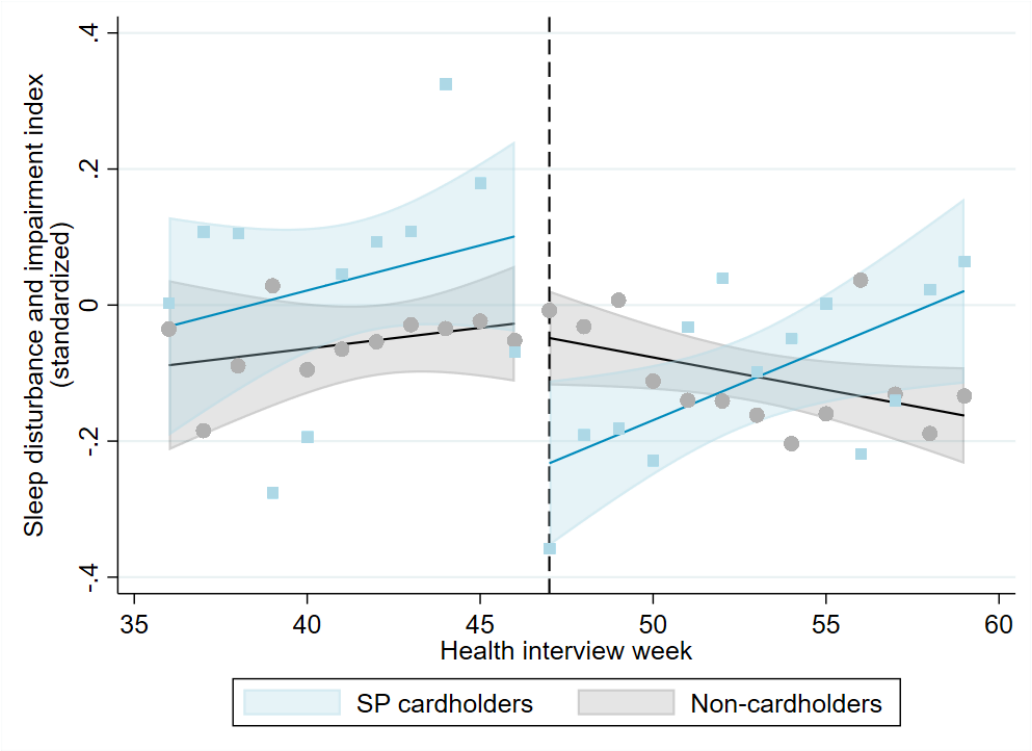


Figure 5. Sharp improvement in sleep quality – as measured by the SDI index – for cardholder household heads, but not for non-cardholder household heads, at the treatment threshold, week 47, the start of BLSM cash transfer disbursement

Notes: The figure plots the standardized SDI index before and after the treatment threshold, week 47, the start of the BLSM cash transfer disbursement. Cardholder household heads are plotted in blue and non-cardholder household heads are plotted in gray. 95% confidence intervals are plotted with standard errors are clustered at the enumeration area level.

Table 1: Households surveyed on or just before week 47 are similar to households surveyed just after week 47

	(1) $\hat{\beta}_1$	(2) Pre-transfer Mean [Sd.]	(3) Obs.	(4) $\hat{\beta}_1$	(5) Pre-transfer Mean [Sd.]	(6) Obs.
Panel a: Across all households						
	All households					
Household head has SDI measure	0.01 (0.01)	0.91 [0.29]	8674			
Reports having an SP card	0.04 (0.03)	0.23 [0.42]	7909			
Panel b: Households						
	SP cardholders			Non-cardholders		
Received Raskin rice (in past year)	0.01 (0.04)	0.83 [0.38]	1813	-0.02 (0.06)	0.47 [0.50]	6080
Household has a member with a health insurance card	0.07 (0.04)	0.78 [0.41]	1815	-0.05 (0.04)	0.37 [0.48]	6094
Household has a family card	-0.00 (0.02)	0.96 [0.21]	1815	-0.00 (0.02)	0.94 [0.24]	6094
Household receives help for poor students	0.01 (0.05)	0.29 [0.46]	1815	0.01 (0.02)	0.07 [0.26]	6094
Household has utilized *letter of poor*	0.02 (0.06)	0.38 [0.49]	1815	-0.01 (0.03)	0.16 [0.37]	6094
Total number of household members	-0.04 (0.18)	4.11 [1.86]	1815	0.01 (0.12)	3.72 [1.72]	6094
Working age houshold members	-0.01 (0.14)	2.56 [1.37]	1815	0.05 (0.08)	2.40 [1.17]	6094
Total number of household members under 16	0.00 (0.12)	1.32 [1.09]	1815	0.01 (0.06)	1.11 [1.02]	6094
Total number of household members over 65	-0.05 (0.06)	0.33 [0.60]	1815	-0.06* (0.03)	0.29 [0.58]	6094
Female headed	-0.02 (0.04)	0.19 [0.39]	1815	0.00 (0.02)	0.18 [0.38]	6094
Total number of female members	0.07 (0.12)	2.06 [1.13]	1815	-0.05 (0.07)	1.90 [1.09]	6094
Log value of homes and non-farmland (IDR 100,000)	-0.17 (0.29)	4.95 [2.60]	1815	0.04 (0.21)	5.53 [2.93]	6093
Log farmland owned (Ha.)	0.11 (0.12)	0.04 [0.27]	1815	-0.00 (0.18)	0.25 [1.42]	6094
Log farmland cultivated (Ha.)	0.11 (0.12)	0.08 [0.34]	1815	0.02 (0.17)	0.20 [1.02]	6094
... p-value on test of joint significance		⟨0.652⟩			⟨0.493⟩	
Panel c: Household heads						
	SP cardholders			Non-cardholders		
No SDI measure	-0.04 (0.02)	0.08 [0.27]	1972	-0.01 (0.02)	0.09 [0.29]	6702
Age	0.26 (1.40)	49.18 [13.70]	1815	0.34 (1.06)	46.97 [14.60]	6094
Female	-0.03 (0.04)	0.19 [0.40]	1815	-0.00 (0.02)	0.18 [0.39]	6094
Over 65	0.00 (0.04)	0.15 [0.36]	1815	-0.00 (0.02)	0.13 [0.34]	6094
Married and/or cohabitating	0.02 (0.04)	0.81 [0.40]	1815	0.01 (0.02)	0.81 [0.39]	6094
Years of schooling	-0.38 (0.47)	5.55 [3.75]	1810	-0.32 (0.44)	8.26 [4.57]	6069
Individual survey start time	-0.05 (0.36)	15.82 [3.76]	1815	0.25 (0.21)	16.03 [3.85]	6094
... p-value on test of joint significance		⟨0.630⟩			⟨0.893⟩	
Panel d: Non-household heads						
	SP cardholders			Non-cardholders		
No SDI measure	-0.02 (0.03)	0.11 [0.31]	3087	-0.00 (0.02)	0.11 [0.31]	9004
Age	-0.80 (1.29)	34.50 [15.08]	2778	-0.22 (0.77)	34.95 [14.89]	8072
Female	-0.01 (0.03)	0.74 [0.44]	2778	-0.03 (0.02)	0.77 [0.42]	8072
Over 65	-0.00 (0.02)	0.04 [0.19]	2778	-0.01 (0.01)	0.04 [0.20]	8072
Married and/or cohabitating	-0.02 (0.04)	0.62 [0.49]	2778	-0.03 (0.02)	0.68 [0.47]	8072
Years of schooling	-0.36 (0.43)	7.33 [3.76]	2767	-0.14 (0.40)	9.09 [4.17]	8044
Individual survey start time	-0.16 (0.31)	15.58 [3.78]	2778	-0.20 (0.20)	15.76 [3.80]	8072
... p-value on test of joint significance		⟨0.943⟩			⟨0.269⟩	

Notes: Units of observation are households in panels (a) and (b) and individuals in panels (c) and (d). All reported $\hat{\beta}_1$ coefficients in columns 1 and 4 are for a linear regression discontinuity specification that includes no controls or fixed effects. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2 and 5, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Columns 3 and 6 report the number of observations used in the estimation. The analysis sample includes 1815 cardholder and 6094 non-cardholder households. The 1815 cardholder households include 1815 household heads and 2778 other members of households. The 6094 non-cardholder households include 6094 household heads and 8072 other members of households. Missing data accounts for small deviations in these values. Lastly, for panels testing balance across multiple variables, the last row reports the p-value of the χ^2 test for joint significance.

Table 2: Increase in BLSM cash transfer receipt for cardholder households, but not for non-cardholder households, just after the start of the BLSM cash transfer disbursement, November 17, 2014

	(1)	(2)
	SP cardholders	Non-cardholders
	$\hat{\beta}_1$	$\hat{\beta}_1$
Received BLSM cash transfer	0.267***	0.009***
	(0.042)	(0.003)
BLSM transfer amount (IDR 100,000)	1.029***	0.027***
	(0.166)	(0.009)
N	1815	6094

Notes: Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. All reported $\hat{\beta}_1$ coefficients are for a linear regression discontinuity specification that includes no controls or fixed effects. Figure 4a and 4b graphically illustrate row 1 and 2, respectively.

Table 3: Improvement in sleep quality – as measured by the standardized SDI index – for cardholder household heads, but not for non-cardholder household heads, just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)
	SP cardholders	Non-cardholders		SP cardholders	Non-cardholders	
	$\hat{\beta}_1$	$\hat{\beta}_1$	p-value of difference	$\hat{\beta}_1$	$\hat{\beta}_1$	p-value of difference
Standardized SDI index	-0.347*** (0.103)	-0.027 (0.061)	$\langle 0.002 \rangle$***	-0.312*** (0.106)	0.002 (0.058)	$\langle 0.004 \rangle$***
FE: Gender	No	No		Yes	Yes	
FE: Age(decade)	No	No		Yes	Yes	
FE: Kabupaten	No	No		Yes	Yes	
N	1815	6094		1815	6094	

Notes: Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. All reported $\hat{\beta}_1$ coefficients are for a linear regression discontinuity specifications that includes the listed controls and fixed effects. Column 3 reports the p-value on the F-test for equality of coefficients between columns 1 and 2 and column 6 reports the p-value on the F-test for equality of coefficients between columns 4 and 5. Figure 5 graphically illustrates columns 1 and 2.

Table 4: Improvement in all component parts of the SDI index for cardholder household heads, but not for non-cardholder household heads, just after the BLSM cash transfer disbursement

	(1)	(2)	(3)
	SP cardholders	Non-cardholders	
Panel a: Standardized aggregated indices	$\hat{\beta}_1$	$\hat{\beta}_1$	p-value of difference
Full sleep disturbance and impairment (SDI) index	-0.32***	0.00	⟨0.004⟩***
	(0.11)	(0.06)	
... Sleep disturbance index	-0.25**	0.06	⟨0.004⟩***
	(0.11)	(0.05)	
... Sleep-related impairment index	-0.29***	-0.04	⟨0.023⟩**
	(0.10)	(0.06)	
Panel b: Standardized responses to the specific question: In the past 7 days ...			
*..... I had trouble sleeping**	-0.26**	0.07	⟨0.006⟩***
	(0.11)	(0.06)	
*..... My quality of sleep was (reversed)**	-0.13	-0.01	⟨0.260⟩
	(0.10)	(0.06)	
..... My quality of sleep was refreshing (reversed)	-0.07	0.04	⟨0.338⟩
	(0.11)	(0.05)	
..... I was satisfied with my sleep (reversed)	-0.12	0.04	⟨0.124⟩
	(0.10)	(0.05)	
..... I had difficulty falling asleep	-0.22**	0.05	⟨0.013⟩**
	(0.11)	(0.05)	
..... I had a hard time concentrating because of poor sleep	-0.29***	-0.02	⟨0.010⟩***
	(0.10)	(0.06)	
..... I had problems during the day because of poor sleep	-0.22**	-0.02	⟨0.069⟩*
	(0.10)	(0.06)	
..... I had a hard time getting things done because I was sleepy	-0.11	-0.07	⟨0.681⟩
	(0.09)	(0.06)	
..... I felt tired	-0.23**	-0.02	⟨0.053⟩*
	(0.10)	(0.06)	
..... I felt irritable because of poor sleep	-0.26**	-0.04	⟨0.056⟩*
	(0.10)	(0.06)	
Observations	1815	6094	

Notes: Question response options are 1: Not at all; 2: A little bit; 3: Somewhat; 4. Quite a bit; 5: Very much; except for question 1 (1: Never; 2: Rarely; 3: Sometimes; 4: Often; 5: Always) and question 2 (1: Very poor; 2: Poor; 3: Fair; 4: Good; 5:Very good). All reported $\hat{\beta}_1$ coefficients are for a linear regression discontinuity specification that includes gender, age decade, and kabupaten fixed effects. Estimates in column 1 are for cardholder household heads and in column 2 are for non-cardholder household heads. Column 3 reports the p-value on the F-test for equality of coefficients between columns 1 and 2. Panel (a) presents impacts on the standardized aggregate score on all questions (our main outcome variable); on the italicized sleep disturbance questions; and on the sleep-related impairment questions. In Panel (b) the dependent variable is the standardized response to the specific question. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * $p<0.1$, ** $p<0.05$ and *** $p<0.01$.

Table 5: Improvement in sleep quality – as measure by the SDI index – for cardholder household heads, but not for other members of cardholder households, irrespective of gender and age, just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)
	SDI index (Std.) $\hat{\beta}_1$	Obs.	Household head share	Female share	
Panel a: All individuals					
All	-0.06 (0.07)	4593	0.40	0.52	
Male	-0.20* (0.10)	2224	0.66	0.00	
Female	0.07 (0.09)	2369	0.15	1.00	
Ages 40 and under	0.03 (0.09)	2560	0.22	0.53	
Ages 41-64	-0.21* (0.12)	1697	0.59	0.50	
Ages 65 and over	0.00 (0.22)	336	0.70	0.49	
Panel b: Household heads					
All	-0.31*** (0.11)	1815	1.00	0.19	
Males	-0.30** (0.12)	1466	1.00	0.00	
Females	-0.36 (0.28)	349	1.00	1.00	
Ages 40 and under	-0.28 (0.19)	572	1.00	0.13	
Ages 41-64	-0.40*** (0.15)	1007	1.00	0.19	
Ages 65 and over	-0.17 (0.28)	236	1.00	0.33	
Males ages 41-64	-0.33* (0.17)	814	1.00	0.00	
Females ages 41-64	-0.84** (0.34)	193	1.00	1.00	
Panel c: Non-household heads					p-value of diff. w/ heads
All	0.11 (0.08)	2778	0.00	0.73	$\langle 0.000 \rangle$***
Males	-0.02 (0.15)	758	0.00	0.00	$\langle 0.093 \rangle$*
Females	0.14 (0.09)	2020	0.00	1.00	$\langle 0.071 \rangle$*
Ages 40 and under	0.14 (0.09)	1988	0.00	0.64	$\langle 0.029 \rangle$**
Ages 41-64	0.06 (0.16)	690	0.00	0.96	$\langle 0.012 \rangle$**
Ages 65 and over	0.32 (0.40)	100	0.00	0.87	$\langle 0.223 \rangle$

Notes: Column 1 reports the estimated impact on the standardized SDI index, $\hat{\beta}_1$, from a linear specification regression discontinuity specification that includes gender, age decade, and kabupaten fixed effects on the specified sub-group of individuals. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The share of the sub-group that identifies as the household head is reported in column 3 and the share of females in column 4. Panel (a) reports estimates pooling all individuals in cardholder households. Panel (b) restricts the sample to cardholder household heads, and Panel (c) to other members of cardholder households. Column 5 reports the p-value on the F-test for equality of coefficients between the same demographic subgroups in Panels (b) and (c).

Table 6: Increase in savings for cardholder households, but not for non-cardholder households, just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	SP cardholding households			Non-cardholding households			
	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference
Panel a: Log household expenditures last month (IDR 100,000)							
Regular transfers and debt repayment	-0.00	1.73	1813	-0.03	3.35	6080	$\langle 0.752 \rangle$
	(0.07)	[11.09]		(0.07)	[18.65]		
Arisan (ROSCA) contributions	0.13**	0.61	1813	0.06	1.47	6080	$\langle 0.276 \rangle$
	(0.06)	[2.15]		(0.06)	[4.38]		
Panel b: Log household expenditures last year (IDR 100,000)							
Irregular transfers	0.10	1.52	1813	-0.04	4.05	6080	$\langle 0.117 \rangle$
	(0.08)	[10.53]		(0.06)	[29.41]		
Panel c: Log value of household's reported assets (IDR 100,000)							
Outstanding loans	-0.19	46.31	1792	-0.07	103.35	6040	$\langle 0.561 \rangle$
	(0.17)	[529.47]		(0.14)	[591.33]		
Savings	0.28**	3.79	1811	0.08	57.40	6068	$\langle 0.223 \rangle$
	(0.12)	[19.51]		(0.14)	[408.42]		

Notes: Dependent variables are calculated as $Log(Y+1)$ where Y is the value measured in IDR 100,000. Reported $\hat{\beta}_1$ coefficients in columns 1 and 4 are for a linear regression discontinuity specification that includes fixed effects for the number of household members, the number under 16 years of age, the number over 65 years of age, the number of female household members, if the household head is female and the household's kabupaten. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2 and 5, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Regular transfers and debt repayment is the reported value of non-food items and debt repayment given to parties outside the household on a regular basis in the past month. Irregular transfers is the value of non-food items given to parties outside the household on an irregular basis in the past year. Column 7 reports the p-value on the F-test for equality of coefficients between columns 1 and 4.

Table 7: Reduction in worries, frustration, and tiredness for cardholder household heads, but not for non-cardholder household heads or other members of cardholder households, just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heads SP cardholders			Heads non-cardholders				Non-head SP cardholders			
	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference
Frustrated	-0.05*	0.12	1815	0.01	0.11	6094	⟨0.064⟩*	0.01	0.11	2778	⟨0.048⟩**
	(0.03)	[0.33]		(0.02)	[0.32]			(0.02)	[0.31]		
Sad	-0.03	0.16	1815	0.01	0.12	6094	⟨0.300⟩	0.02	0.13	2778	⟨0.265⟩
	(0.04)	[0.36]		(0.02)	[0.32]			(0.03)	[0.33]		
Enthusiastic	-0.01	0.58	1815	-0.01	0.62	6094	⟨0.958⟩	0.03	0.56	2778	⟨0.489⟩
	(0.05)	[0.49]		(0.03)	[0.49]			(0.05)	[0.50]		
Lonely	0.05	0.16	1815	0.04*	0.15	6094	⟨0.771⟩	-0.03	0.16	2778	⟨0.043⟩**
	(0.03)	[0.37]		(0.02)	[0.35]			(0.03)	[0.37]		
Content	-0.03	0.59	1815	-0.01	0.68	6094	⟨0.642⟩	-0.05	0.66	2778	⟨0.683⟩
	(0.04)	[0.49]		(0.03)	[0.47]			(0.05)	[0.47]		
Worried	-0.09***	0.21	1815	0.02	0.18	6094	⟨0.010⟩***	0.01	0.21	2778	⟨0.024⟩**
	(0.03)	[0.41]		(0.03)	[0.39]			(0.03)	[0.41]		
Bored	0.01	0.11	1815	-0.01	0.12	6094	⟨0.502⟩	0.01	0.17	2778	⟨0.859⟩
	(0.03)	[0.31]		(0.02)	[0.33]			(0.03)	[0.38]		
Happy	0.01	0.65	1815	0.02	0.76	6094	⟨0.927⟩	-0.01	0.73	2778	⟨0.725⟩
	(0.05)	[0.48]		(0.03)	[0.43]			(0.04)	[0.45]		
Angry	-0.00	0.07	1815	-0.03	0.10	6094	⟨0.389⟩	0.07**	0.15	2778	⟨0.079⟩*
	(0.03)	[0.26]		(0.02)	[0.30]			(0.03)	[0.36]		
Tired	-0.09**	0.46	1815	-0.01	0.45	6094	⟨0.108⟩	0.04	0.46	2778	⟨0.010⟩***
	(0.04)	[0.50]		(0.03)	[0.50]			(0.04)	[0.50]		
Stressed	-0.01	0.09	1815	-0.01	0.09	6094	⟨0.997⟩	0.00	0.10	2778	⟨0.757⟩
	(0.03)	[0.29]		(0.02)	[0.29]			(0.02)	[0.30]		
Pain	-0.04	0.25	1815	0.03*	0.21	6094	⟨0.071⟩*	0.01	0.22	2778	⟨0.276⟩
	(0.04)	[0.43]		(0.02)	[0.41]			(0.03)	[0.41]		

Notes: Dependent variables are indicators set to 1 if the individual reports that yesterday they felt more than a little of the affect listed (response options were not at all, a little, somewhat, quite a bit and very). Reported $\hat{\beta}_1$ coefficients in columns 1, 4 and 8 are for a linear regression discontinuity specification that includes fixed effects for the individuals age decade, gender, kabupaten, the order of the affect list, and the day of the week. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2, 5 and 9, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Column 7 reports the p-value on the F-test for equality of coefficients between columns 1 and 4. Column 11 reports the p-value on the F-test for equality of coefficients between columns 1 and 8.

Table 8: Improvement in cognitive performance sensitive to sleep deprivation for cardholder household heads, but not for non-cardholder household heads or other members of cardholder households, just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Heads SP cardholders		Heads non-cardholders			Non-head SP cardholders		
	$\hat{\beta}_1$	Obs.	$\hat{\beta}_1$	Obs.	p-value of difference	$\hat{\beta}_1$	Obs.	p-value of difference
Panel a: Standardized performance on cognition and memory tests								
Ravens matrices	-0.01	1773	-0.01	6011	⟨0.954⟩	-0.03	2750	⟨0.855⟩
	(0.10)		(0.07)			(0.08)		
Math questions	-0.04	1425	0.06	4924	⟨0.364⟩	0.00	2579	⟨0.652⟩
	(0.10)		(0.07)			(0.08)		
Number series	-0.06	1814	-0.02	6085	⟨0.700⟩	-0.08	2776	⟨0.850⟩
	(0.11)		(0.07)			(0.09)		
Rapid word recall	0.20**	1806	0.00	6059	⟨0.048⟩**	0.07	2769	⟨0.191⟩
	(0.10)		(0.07)			(0.09)		
Delayed word recall	0.20**	1806	-0.00	6059	⟨0.022⟩**	0.06	2769	⟨0.177⟩
	(0.08)		(0.06)			(0.09)		
Panel b: Interviewer's assessment of respondent's attention is excellent								
Attention on first questionnaire	0.04	1815	0.01	6092	⟨0.370⟩	0.01	2775	⟨0.406⟩
	(0.03)		(0.02)			(0.02)		
Attention on second questionnaire	0.07**	1815	0.00	6092	⟨0.026⟩**	0.03	2775	⟨0.270⟩
	(0.03)		(0.02)			(0.02)		

Notes: Dependent variables in Panel (a) are standardized. Dependent variables in Panel (b) are indicators set to 1 if the interviewer considers the respondents attention during the survey to be excellent, with interviewer fixed effects residualized out. Reported $\hat{\beta}_1$ coefficients in columns 1, 3 and 6 are for a linear specification that includes fixed effects for the individuals age decade, gender, and kabupaten as well as a fixed effect for the assigned word list for rapid and delayed word recall. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. Column 5 reports the p-value on the F-test for equality of coefficients between columns 1 and 3. Column 8 reports the p-value on the F-test for equality of coefficients between columns 1 and 6.

Appendix

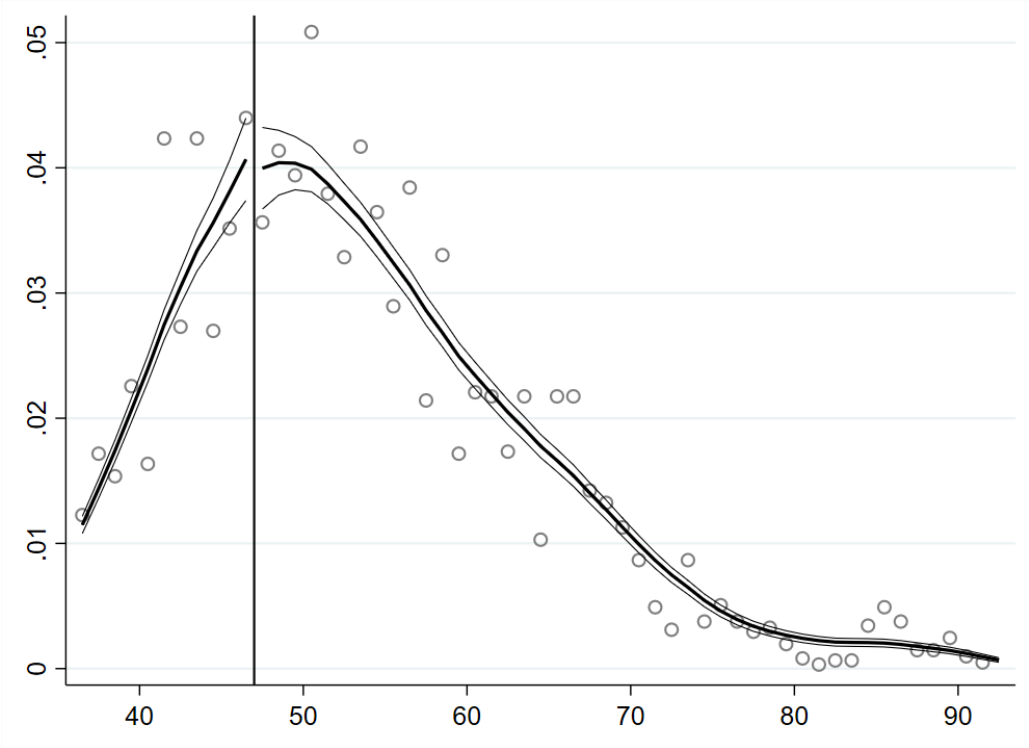


Figure A1. Density of the survey week distribution is continuous across the treatment threshold for cardholder household heads

Notes: The McCrary test statistic for cardholder household heads is -0.05 with a standard error of 0.07 .

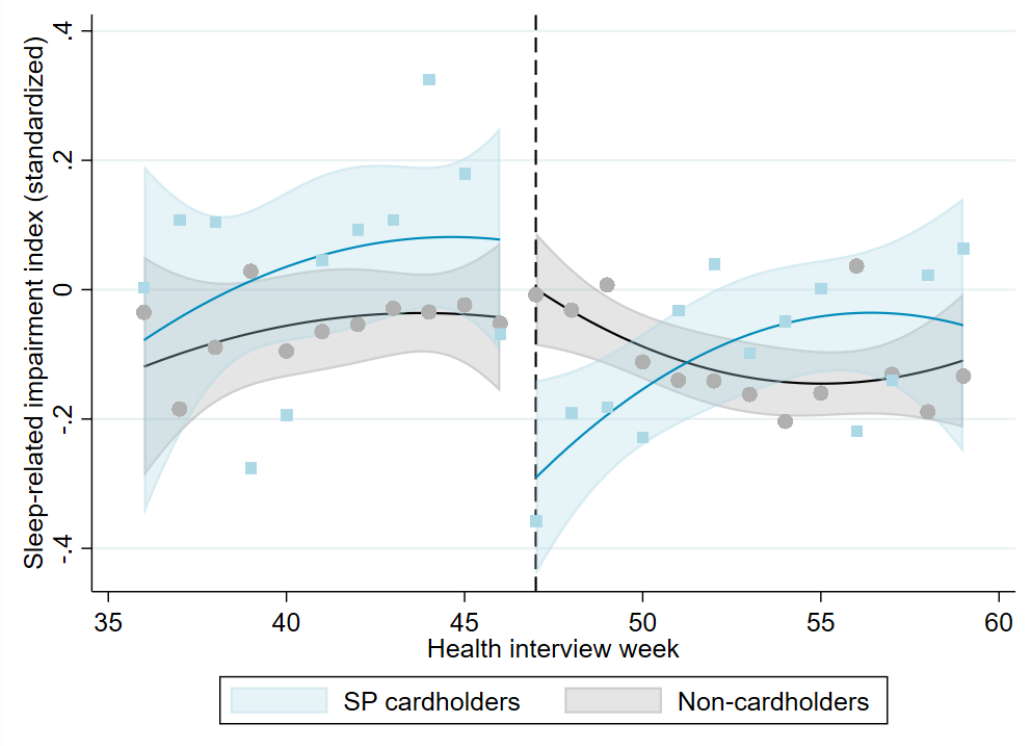


Figure A2. Quadratic regression discontinuity specification: sharp improvement in sleep quality – as measured by the SDI index – for cardholder households, but not for non-cardholder households, at the treatment threshold, week 47, the start of BLSM cash transfer disbursement

Notes: The figure plots the standardized SDI index before and after the treatment threshold, week 47, the start of the BLSM cash transfer disbursement. Cardholder household heads are plotted in blue and non-cardholder household heads are plotted in gray. 95% confidence intervals are plotted with standard errors are clustered at the enumeration area level.

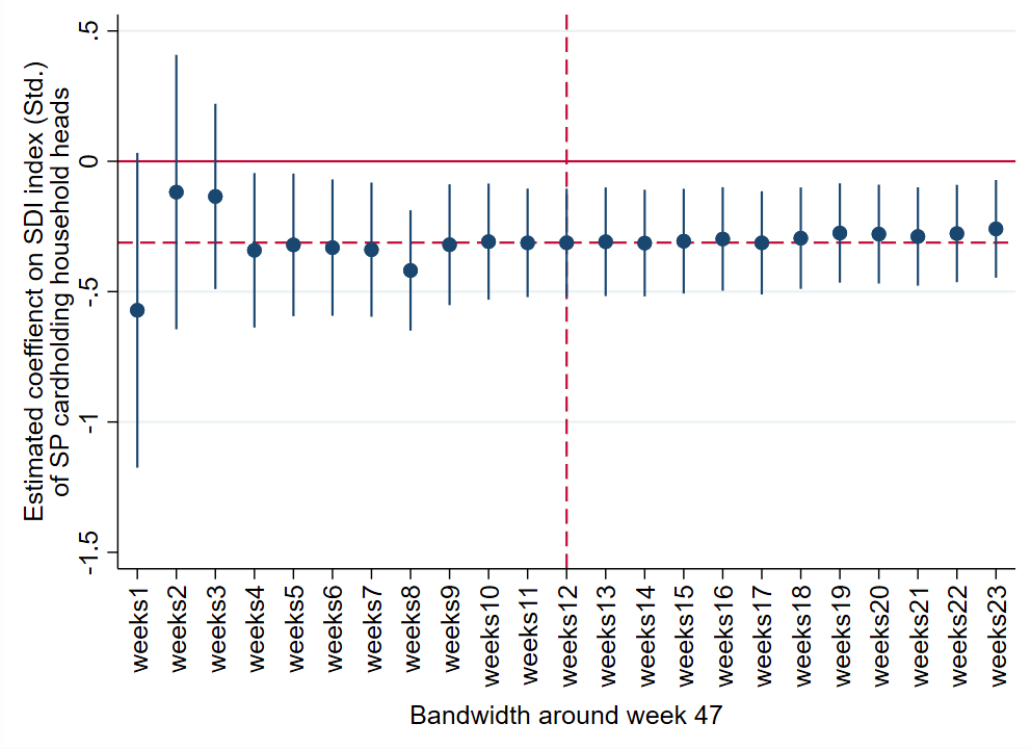


Figure A3. Improvement in sleep quality – as measured by SDI index – for cardholder household heads is robust to bandwidth choice

Notes: Plotted estimates show the estimate of $\hat{\beta}_1$ with age decade, gender and kabupaten fixed effects using different bandwidths around the transfer disbursement week. Note that as there are only 11 weeks of surveys prior to the transfer, widening the bandwidth beyond 11 weeks only extends the post period. The dashed lines highlight the bandwidth used throughout the paper. The figure display 95% confidence intervals with standard errors clustered at the enumeration area.

Table A1: Quadratic regression discontinuity specification: improvement in sleep quality – as measured by the standardized SDI index – for cardholder household heads, but not for non-cardholder household heads, just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)
	Linear		Quadratic	
Panel a: For SP cardholding heads				
Post	-0.347***	-0.312***	-0.360**	-0.389**
	(0.103)	(0.106)	(0.155)	(0.153)
Observations	1815	1815	1815	1815
Panel b: For non-cardholding heads				
Post	-0.0272	0.00201	0.0514	0.106
	(0.0606)	(0.0578)	(0.0946)	(0.0884)
Observations	6094	6094	6094	6094
FE: Gender	No	Yes	No	Yes
FE: Age(decade)	No	Yes	No	Yes
FE: Kabupaten	No	Yes	No	Yes

Notes: Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. All reported $\hat{\beta}_1$ coefficients are for a quadratic regression discontinuity specifications that includes the listed controls and fixed effects.

Table A2: All estimates presented in the paper are robust to relaxation of sample restrictions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Main sample					...dropping observed head SDI restriction					...dropping observed head SDI and strict window restrictions				
Panel a: First stage															
	Heads SP card	Heads no-card				Heads SP card	Heads no-card				Heads SP card	Heads no-card			
Received BLSM cash transfer	0.27***	0.01***				0.27***	0.01***				0.27***	0.01***			
	(0.04)	(0.00)				(0.04)	(0.00)				(0.04)	(0.00)			
	[1815]	[6094]				[1815]	[6094]				[1817]	[6113]			
BLSM transfer amount (IDR 100,000)	1.03***	0.03***				1.03***	0.03***				1.03***	0.03***			
	(0.17)	(0.01)				(0.17)	(0.01)				(0.17)	(0.01)			
	[1815]	[6094]				[1815]	[6094]				[1817]	[6113]			
Panel b: Individual outcome variables															
	Heads SP card	Heads no-card	p-value of diff. w/ SP heads	Non-head SP card	p-value of diff. w/ SP heads	Heads SP card	Heads no-card	p-value of diff. w/ SP heads	Non-heads SP card	p-value of diff. w/ SP heads	Heads SP card	Heads no-card	p-value of diff. w/ SP heads	Non-heads SP card	p-value of diff. w/ SP heads
SDI index (Standardized)	-0.31***	0.00		0.11		-0.31***	0.00		0.09		-0.31***	0.00		0.09	
	(0.11)	(0.06)	⟨0.004⟩***	(0.08)	⟨0.000⟩***	(0.11)	(0.06)	⟨0.004⟩***	(0.08)	⟨0.000⟩***	(0.11)	(0.06)	⟨0.005⟩***	(0.08)	⟨0.000⟩***
	[1815]	[6094]		[2778]		[1815]	[6094]		[2986]		[1817]	[6113]		[3152]	
Yesterday was more than a little worried	-0.09***	0.02		0.01		-0.09***	0.02		0.01		-0.09***	0.01		0.00	
	(0.03)	(0.03)	⟨0.010⟩***	(0.03)	⟨0.024⟩**	(0.03)	(0.03)	⟨0.010⟩***	(0.03)	⟨0.028⟩**	(0.03)	(0.03)	⟨0.012⟩**	(0.03)	⟨0.041⟩**
	[1815]	[6094]		[2778]		[1815]	[6094]		[2986]		[1817]	[6113]		[3152]	
Yesterday was more than a little frustrated	-0.05*	0.01		0.01		-0.05*	0.01		0.01		-0.05*	0.01		0.02	
	(0.03)	(0.02)	⟨0.064⟩*	(0.02)	⟨0.048⟩**	(0.03)	(0.02)	⟨0.064⟩*	(0.02)	⟨0.053⟩*	(0.03)	(0.02)	⟨0.071⟩*	(0.02)	⟨0.037⟩**
	[1815]	[6094]		[2778]		[1815]	[6094]		[2986]		[1817]	[6113]		[3152]	
Yesterday was more than a little tired	-0.09**	-0.01		0.04		-0.09**	-0.01		0.04		-0.09**	-0.01		0.05	
	(0.04)	(0.03)	⟨0.108⟩	(0.04)	⟨0.010⟩***	(0.04)	(0.03)	⟨0.108⟩	(0.04)	⟨0.013⟩**	(0.04)	(0.03)	⟨0.100⟩	(0.04)	⟨0.003⟩***
	[1815]	[6094]		[2778]		[1815]	[6094]		[2986]		[1817]	[6113]		[3152]	
Rapid word recall	0.20**	0.00		0.07		0.20**	0.00		0.07		0.21**	0.00		0.03	
	(0.10)	(0.07)	⟨0.048⟩**	(0.09)	⟨0.191⟩	(0.10)	(0.07)	⟨0.048⟩**	(0.09)	⟨0.178⟩	(0.10)	(0.07)	⟨0.047⟩**	(0.08)	⟨0.076⟩*
	[1806]	[6059]		[2769]		[1806]	[6059]		[2977]		[1808]	[6078]		[3143]	
Delayed word recall	0.20**	-0.00		0.06		0.20**	-0.00		0.07		0.21***	-0.00		0.04	
	(0.08)	(0.06)	⟨0.022⟩**	(0.09)	⟨0.177⟩	(0.08)	(0.06)	⟨0.022⟩**	(0.09)	⟨0.176⟩	(0.08)	(0.06)	⟨0.021⟩**	(0.08)	⟨0.101⟩
	[1806]	[6059]		[2769]		[1806]	[6059]		[2977]		[1808]	[6078]		[3143]	
Enumerator rated attention as excellent	0.07**	0.00		0.03		0.07**	0.00		0.04		0.07**	0.00		0.03	
	(0.03)	(0.02)	⟨0.026⟩**	(0.02)	⟨0.270⟩	(0.03)	(0.02)	⟨0.026⟩**	(0.02)	⟨0.397⟩	(0.03)	(0.02)	⟨0.025⟩**	(0.02)	⟨0.299⟩
	[1815]	[6092]		[2775]		[1815]	[6093]		[2983]		[1817]	[6112]		[3149]	
Panel c: Household variables															
	SP card	No-card	p-value of diff.			SP card	No-card	p-value of diff.			SP card	No-card	p-value of diff.		
Log arisan contributions last month	0.13**	0.06				0.13**	0.06				0.12**	0.05			
	(0.06)	(0.06)	⟨0.276⟩			(0.06)	(0.06)	⟨0.214⟩			(0.06)	(0.05)	⟨0.222⟩		
	[1813]	[6080]				[1969]	[6670]				[2098]	[7163]			
Log household savings	0.28**	0.08				0.18	0.09				0.19*	0.06			
	(0.12)	(0.14)	⟨0.223⟩			(0.11)	(0.13)	⟨0.536⟩			(0.11)	(0.13)	⟨0.401⟩		
	[1811]	[6068]				[1968]	[6668]				[2099]	[7158]			

Notes: Columns 6-10 relax the restrictions that limited the sample to include households where the household head answered the 10-item questionnaire on sleep quality. Columns 11-15 further relax restrictions that limited the the sample to include (i) households where the household survey and household head was interviewed was conducted within 12 weeks before or after November 17, 2014, and (ii) household members interviewed within 12 weeks before or after November 17, 2014. Reported $\hat{\beta}_1$ coefficients are for a linear specification that includes the same set of fixed effects used for that dependent variable in the main paper: for the individuals specifications these include age decade, gender, and kabupaten fixed effect with the addition of affect list and day of the week fixed effects for affect outcomes and the word list assigned for the word recall outcomes. For household variables fixed effects for the number of household members, the number under 16 years of age, the number over 65 years of age, the number of female household members, if the household head is female and the household's kabupaten are included. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. Columns 3, 8 and 13 reports the p-value on the F-test for equality of coefficients between cardholder and non-cardholder household heads in the sample. Columns 5,10, and 15 reports the p-value on the F-test for equality between cardholder household heads and other members of cardholder households.

Table A3: No statistically significant improvement in mental health – as measured by the CES-Depression scale – for cardholder household heads just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heads SP cardholders			Heads non-cardholders				Non-head SP cardholders			
	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference
Standardized values of cesd	-0.14	0.15	1815	0.13**	-0.05	6094	⟨0.020⟩**	-0.02	0.25	2778	⟨0.339⟩
	(0.12)	[1.06]		(0.06)	[0.98]			(0.09)	[1.03]		

Notes: Dependent variables are the standardized scores on the 10 item CES-D mental health questionnaire. Reported $\hat{\beta}_1$ coefficients in columns 1, 4 and 8 are for a linear regression discontinuity specification that includes fixed effects for the individuals age decade, gender, and kabupaten. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2, 5 and 9, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Column 7 reports the p-value on the F-test for equality of coefficients between columns 1 and 4. Column 11 reports the p-value on the F-test for equality of coefficients between columns 1 and 8.

Table A4: No statistically significant change in asset values that include sleeping aids for cardholder households just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	SP cardholding households			Non-cardholding households			
	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference
Panel a: Log household expenditures last month (IDR 100,000)							
Electricity	0.03	0.51	1813	0.05	0.84	6080	$\langle 0.712 \rangle$
	(0.03)	[0.73]		(0.03)	[1.18]		
Fuel	0.00	0.39	1813	-0.01	0.76	6080	$\langle 0.545 \rangle$
	(0.03)	[0.49]		(0.02)	[14.44]		
Personal toiletries	0.03	0.47	1813	-0.00	0.76	6080	$\langle 0.309 \rangle$
	(0.03)	[0.74]		(0.03)	[1.19]		
Household items	-0.01	0.36	1813	0.01	0.46	6080	$\langle 0.642 \rangle$
	(0.02)	[0.40]		(0.02)	[0.93]		
Panel b: Log household expenditures last year (IDR 100,000)							
Household supplies and furniture	-0.08	1.57	1813	-0.03	3.45	6080	$\langle 0.493 \rangle$
	(0.07)	[6.40]		(0.06)	[14.69]		
Misc. annual expenditures	-0.01	6.59	1813	-0.04	43.06	6080	$\langle 0.810 \rangle$
	(0.12)	[25.63]		(0.11)	[317.13]		
Panel c: Log value of household's reported assets (IDR 100,000)							
Appliances	0.11	17.94	1813	0.02	42.16	6082	$\langle 0.440 \rangle$
	(0.11)	[27.50]		(0.11)	[72.03]		
Furniture and Utensils	-0.03	20.29	1810	0.03	47.70	6076	$\langle 0.600 \rangle$
	(0.09)	[24.60]		(0.09)	[98.42]		

Notes: Dependent variables are calculated as $Log(Y+1)$ where Y is the value measured in IDR 100,000. Reported $\hat{\beta}_1$ coefficients in columns 1 and 4 are for a linear regression discontinuity specification that includes fixed effects for the number of household members, the number under 16 years of age, the number over 65 years of age, the number of female household members, if the household head is female and the household's kabupaten. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2 and 5, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Column 7 reports the p-value on the F-test for equality of coefficients between columns 1 and 4. The questionnaire lists examples of items for broad expenditure categories. Particularly relevant examples listed in the questionnaire include anti-mosquito items in the monthly household items category; bed sheets in the annual household supplies and furniture category; and beds in the miscellaneous annual expenditures category.

Table A5: No statistically significant change in other assets and expenditures for cardholder households just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	SP cardholding households			Non-cardholding households			
	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference
Panel a: Log household expenditures (IDR 100,000)							
Other monthly non-food expenditures	0.09	2.13	1813	-0.01	4.47	6080	$\langle 0.243 \rangle$
	(0.06)	[6.85]		(0.06)	[8.60]		
Other annual expenditures	-0.01	25.73	1813	0.01	48.07	6080	$\langle 0.844 \rangle$
	(0.11)	[42.42]		(0.07)	[124.22]		
Panel b: Log value of other household assets (IDR 100,000)							
Other belongings	-0.14	60.80	1815	-0.03	224.00	6093	$\langle 0.574 \rangle$
	(0.19)	[91.46]		(0.16)	[632.91]		
Panel c: Other							
Log household earnings (IDR 100,000)	-0.11	351.89	1815	-0.09	546.09	6094	$\langle 0.876 \rangle$
	(0.11)	[563.66]		(0.09)	[1059.51]		

Notes: Dependent variables are calculated as $Log(Y+1)$ where Y is the value measured in IDR 100,000. Reported $\hat{\beta}_1$ coefficients in columns 1 and 4 are for a linear regression discontinuity specification that includes fixed effects for the number of household members, the number under 16 years of age, the number over 65 years of age, the number of female household members, if the household head is female and the household's kabupaten. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2 and 5, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Column 7 reports the p-value on the F-test for equality of coefficients between columns 1 and 4. Other monthly non-food expenditures include expenditures on recreation, sweepstakes, transportation, water, phones and servants. Other annual expenditures include expenditures on clothing, medical care, ceremonies and taxes. Other belongings include the value of jewelry, receivables, vehicles, hard-stem plants and the unlisted category.

Table A6: No statistically significant change in nutrition indicators for cardholder households or household heads just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	SP cardholding			Non-cardholding			
	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference
Panel a: Log of household food consumption last week (IDR 100,000)							
Food consumption	-0.05	3.49	1814	0.00	4.51	6080	⟨0.266⟩
	(0.04)	[2.43]		(0.04)	[3.44]		
... Alcohol consumption	-0.01	0.00	1813	-0.00	0.01	6074	⟨0.654⟩
	(0.01)	[0.04]		(0.00)	[0.16]		
... Cigarette consumption	-0.04	0.42	1797	-0.01	0.47	6045	⟨0.372⟩
	(0.03)	[0.55]		(0.02)	[0.74]		
... Betel nut consumption	-0.00	0.01	1814	0.00	0.01	6078	⟨0.473⟩
	(0.00)	[0.08]		(0.00)	[0.06]		
Panel b: Log of value of household's reported assets (IDR 100,000)							
Livestock and poultry	0.13	2.34	1815	0.00	8.35	6093	⟨0.179⟩
	(0.09)	[15.30]		(0.06)	[96.01]		
Panel c: Food consumption of household head							
Meals per day	0.01	2.60	1802	-0.04	2.67	6032	⟨0.326⟩
	(0.05)	[0.53]		(0.04)	[0.51]		
Reports adequate food consumption	0.01	0.73	1815	-0.03	0.87	6093	⟨0.252⟩
	(0.04)	[0.44]		(0.02)	[0.33]		

Notes: Dependent variables in Panels (a) and (b) are calculated as $Log(Y+1)$ where Y is the value measured in IDR 100,000. Meals per day is a continuous variable and reporting adequate food consumption is an indicator set to 1 if the respondent reports that their food consumption is adequate or more than adequate for their needs. Reported $\hat{\beta}_1$ coefficients in columns 1 and 4 are for a linear regression discontinuity specification. Fixed effects for Panels (a) and (b) include the number of household members, the number under 16 years of age, the number over 65 years of age, the number of female household members, if the household head is female and the household's kabupaten. Fixed effects for Panel (c) include gender, age decade and kabupaten fixed effects. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2 and 5, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Column 7 reports the p-value on the F-test for equality of coefficients between columns 1 and 4.

Table A7: No statistically significant change in rise time, bed time, and hours worked for cardholder household heads just after the BLSM cash transfer disbursement

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Heads SP cardholders			Heads non-cardholders				Non-head SP cardholders			
	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference	$\hat{\beta}_1$	Pre-transfer Mean [Sd.]	Obs.	p-value of difference
Rise time yesterday (hrs.)	-0.01	5.07	1803	0.02	5.02	6066	⟨0.879⟩	0.12	5.22	2769	⟨0.533⟩
	(0.18)	[2.21]		(0.14)	[2.31]			(0.17)	[2.18]		
Bed time yesterday (hrs.)	0.21	22.30	1799	-0.07	22.42	6064	⟨0.132⟩	0.30**	22.00	2762	⟨0.641⟩
	(0.16)	[2.04]		(0.10)	[2.08]			(0.15)	[2.11]		
Work hours last week	1.65	34.24	1815	2.82*	34.60	6094	⟨0.661⟩	-0.96	22.34	2778	⟨0.456⟩
	(2.39)	[26.98]		(1.51)	[28.03]			(2.56)	[26.97]		

Notes: Work hours last week is winsorized at the 1 percent level. Reported $\hat{\beta}_1$ coefficients in columns 1, 4, and 8 are for a linear regression discontinuity specification that includes gender, age decade, day of the week and kabupaten fixed effects. Standard errors are reported in parentheses, clustered at the enumeration area, with the following significance indicators: * p<0.1, ** p<0.05 and ***p<0.01. The mean and standard deviations of the dependent variables, reported in columns 2. 5 and 9, are calculated using the subset of pre-transfer observations interviewed prior to week 47. Columns 7 and 11 reports the p-value on the F-test for equality of coefficients with cardholder household heads; that is, between columns 1 and 4, and 1 and 8, respectively.