Online Appendix 1 of 2

"Understanding the Average Impact of Microcredit: A Bayesian Hierarchical Analysis of Seven Randomized Experiments"

Rachael Meager

# Appendix B

# Robustness Checks

**Online Appendix B for "Understanding the Average Impact of Microcredit: A Bayesian Hierarchical Analysis of Seven Randomized Experiments" by Rachael Meager**

## B.1 Robustness to Omission of Any Single Study

Table B.1: Leave-One-Out Sensitivity of inference on average treatment effect in the Rubin model

| | | **Omitted Country** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Outcome** | | Mexico | Mongolia | Bosnia | India | Morocco | Philippines | Ethiopia |
| Profit | $\hat{\tau}$ | 11.737 | 11.761 | 4.930 | 6.643 | 6.602 | 6.463 | 9.160 |
| | $\hat{se}_\tau$ | 10.462 | 11.030 | 7.707 | 9.995 | 10.808 | 7.952 | 11.446 |
| Revenues | $\hat{\tau}$ | 25.336 | 27.246 | 13.486 | 20.133 | 10.992 | 20.139 | 25.178 |
| | $\hat{se}_\tau$ | 25.768 | 23.098 | 16.190 | 22.540 | 14.679 | 17.998 | 25.411 |
| Expenditures | $\hat{\tau}$ | 7.936 | 12.546 | 6.447 | 8.840 | 6.025 | 8.518 | 12.068 |
| | $\hat{se}_\tau$ | 12.234 | 11.734 | 9.372 | 9.602 | 8.735 | 8.433 | 13.317 |
| Consumption | $\hat{\tau}$ | 6.651 | 2.330 | 8.005 | 7.587 | 9.435 | | |
| | $\hat{se}_\tau$ | 34.372 | 9.392 | 24.011 | 29.936 | 22.888 | | |
| Consumer Durables | $\hat{\tau}$ | | 3.199 | 1.989 | 1.317 | 2.516 | | |
| | $\hat{se}_\tau$ | | 10.077 | 3.294 | 8.616 | 9.092 | | |
| Temptation Goods | $\hat{\tau}$ | -1.178 | -1.202 | -0.268 | -0.523 | -1.076 | | |
| | $\hat{se}_\tau$ | 3.721 | 2.795 | 3.667 | 3.355 | 4.231 | | |

Table B.2: Leave-One-Out Sensitivity of inference on heterogeneity in the Rubin model

| | | **Omitted Country** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Outcome** | | Mexico | Mongolia | Bosnia | India | Morocco | Philippines | Ethiopia |
| Profit | $\hat{\sigma_\tau}$ | 16.051 | 16.668 | 10.980 | 14.311 | 14.636 | 12.356 | 16.922 |
| | $\hat{se}_{\sigma_\tau}$ | 13.101 | 14.186 | 10.148 | 13.958 | 14.164 | 9.997 | 14.760 |
| Revenues | $\hat{\sigma_\tau}$ | 41.828 | 35.284 | 24.395 | 35.396 | 20.215 | 29.043 | 41.885 |
| | $\hat{se}_{\sigma_\tau}$ | 32.693 | 30.538 | 22.609 | 30.452 | 21.357 | 22.963 | 32.539 |
| Expenditures | $\hat{\sigma_\tau}$ | 16.559 | 16.823 | 12.537 | 14.310 | 11.968 | 12.485 | 19.884 |
| | $\hat{se}_{\sigma_\tau}$ | 17.203 | 15.575 | 13.234 | 13.213 | 12.626 | 10.643 | 17.383 |
| Consumption | $\hat{\sigma_\tau}$ | 33.284 | 9.316 | 23.829 | 33.906 | 25.815 | | |
| | $\hat{se}_{\sigma_\tau}$ | 50.218 | 17.048 | 39.769 | 47.298 | 40.517 | | |
| Consumer Durables | $\hat{\sigma_\tau}$ | | 7.734 | 3.577 | 6.143 | 7.552 | | |
| | $\hat{se}_{\sigma_\tau}$ | | 12.080 | 4.226 | 10.612 | 11.763 | | |
| Temptation Goods | $\hat{\sigma_\tau}$ | 3.980 | 2.991 | 2.084 | 2.972 | 4.236 | | |
| | $\hat{se}_{\sigma_\tau}$ | 6.932 | 5.881 | 5.734 | 6.577 | 6.993 | | |

Table B.3: Sensitivity of inference on average treatment effect to LOO choice in the joint model

| | | **Omitted Country** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Outcome** | | Mexico | Mongolia | Bosnia | India | Morocco | Philippines | Ethiopia |
| Profit | $\hat{\tau}$ | 11.026 | 11.127 | 3.903 | 5.416 | 5.002 | 6.596 | 7.753 |
| | $\hat{se}_\tau$ | 9.258 | 8.971 | 6.179 | 7.748 | 7.870 | 6.444 | 9.481 |
| Revenues | $\hat{\tau}$ | 20.768 | 20.453 | 10.371 | 14.842 | 7.911 | 18.072 | 19.562 |
| | $\hat{se}_\tau$ | 16.915 | 13.126 | 9.943 | 13.056 | 8.359 | 11.886 | 16.481 |
| Expenditures | $\hat{\tau}$ | 5.564 | 10.909 | 5.644 | 7.006 | 4.744 | 8.136 | 10.519 |
| | $\hat{se}_\tau$ | 7.361 | 8.118 | 6.079 | 6.862 | 5.681 | 6.553 | 9.307 |
| Consumption | $\hat{\tau}$ | 2.274 | 2.438 | 4.045 | 3.024 | 5.644 | | |
| | $\hat{se}_\tau$ | 7.965 | 4.989 | 5.270 | 7.814 | 7.340 | | |
| Consumer Durables | $\hat{\tau}$ | | 3.199 | 1.989 | 1.317 | 2.516 | | |
| | $\hat{se}_\tau$ | | 10.077 | 3.294 | 8.616 | 9.092 | | |
| Temptation Goods | $\hat{\tau}$ | -1.240 | -1.105 | -0.423 | -0.551 | -1.084 | | |
| | $\hat{se}_\tau$ | 1.898 | 1.722 | 1.247 | 1.816 | 1.987 | | |

Table B.4: Sensitivity of inference on heterogeneity to LOO choice in the joint model

| | | **Omitted Country** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Outcome** | | Mexico | Mongolia | Bosnia | India | Morocco | Philippines | Ethiopia |
| Profit | $\hat{\sigma_\tau}$ | 11.590 | 11.367 | 7.479 | 9.001 | 8.876 | 9.037 | 11.279 |
| | $\hat{se}_{\sigma_\tau}$ | 8.319 | 8.665 | 6.265 | 7.937 | 7.898 | 6.056 | 9.228 |
| Revenues | $\hat{\sigma_\tau}$ | 22.242 | 14.469 | 12.292 | 16.714 | 10.228 | 16.598 | 21.433 |
| | $\hat{se}_{\sigma_\tau}$ | 15.193 | 12.896 | 9.852 | 12.984 | 8.149 | 10.521 | 15.275 |
| Expenditures | $\hat{\sigma_\tau}$ | 8.305 | 9.745 | 7.766 | 8.705 | 7.053 | 8.378 | 11.985 |
| | $\hat{se}_{\sigma_\tau}$ | 7.254 | 7.453 | 5.968 | 6.786 | 5.769 | 5.792 | 8.089 |
| Consumption | $\hat{\sigma_\tau}$ | 8.078 | 5.265 | 5.510 | 8.417 | 7.454 | | |
| | $\hat{se}_{\sigma_\tau}$ | 8.795 | 5.044 | 5.745 | 8.716 | 8.407 | | |
| Consumer Durables | $\hat{\sigma_\tau}$ | | 7.734 | 3.577 | 6.143 | 7.552 | | |
| | $\hat{se}_{\sigma_\tau}$ | | 12.080 | 4.226 | 10.612 | 11.763 | | |
| Temptation Goods | $\hat{\sigma_\tau}$ | 2.512 | 2.189 | 1.617 | 2.223 | 2.736 | | |
| | $\hat{se}_{\sigma_\tau}$ | 2.539 | 2.262 | 1.731 | 2.497 | 2.494 | | |

## B.2 Prior Sensitivity Robustness Checks

While the functional form choices for the priors are based on recommendations underpinned by research in statistics, in some cases the exact parameter choices that characterise these priors remains somewhat arbitrary in this analysis. In general it makes sense to center the priors on the slopes and intercepts around zero - reflecting both a weak default skepticism of any effect until the evidence shows otherwise and a desire to conform to the regularization or penalty direction implied by frequentist and machine learning procedures (Ridge, Lasso, etc). For the microcredit literature, the *a priori* confidence in this position should be weak in general to reflect widespread disagreement in the policy and research world about the likely outcomes, and to avoid imposing too strong a penalty. However, it is somewhat arbitrary how weak this information is chosen to be – should the prior uncertainty about the value of $\tau$ be captured by a prior standard deviation of 50 or 500? The answer is theoretically obtainable from the research and policy community with prior elicitation techniques before the data is released, although in economics this rarely occurs. But if in fact it makes negligible difference to the posterior inference whether one chooses any of the set of reasonably weak options, then there is little need for such efforts and little lost by having failed to elicit priors.

In this appendix section I show that the posterior inference presented in this paper is indeed largely unaffected by reasonable alternative weakly informative prior choices. I consider the following prior options for the Rubin (1981) model:

| Prior Choice Index | Rubin Model Prior Specification |
|---|---|
| 1 | $\tau \sim N(0,50), \sigma_\tau \sim U[0,100]$ |
| 2 | $\tau \sim N(0,70), \sigma_\tau \sim U[0,100]$ |
| 3 | $\tau \sim N(0,100), \sigma_\tau \sim U[0,100]$ |
| 4 | $\tau \sim N(0,100), \sigma_\tau \sim U[0,500]$ |
| 5 | $\tau \sim N(0,200), \sigma_\tau \sim U[0,500]$ |
| 6 | $\tau \sim N(0,500), \sigma_\tau \sim U[0,1000]$ |
| 7 | $\tau \sim N(0,50), \sigma_\tau \sim U[0,1000]$ |
| 8 | $\tau \sim N(0,70), \sigma_\tau \sim U[0,1000]$ |
| 9 | $\tau \sim N(0,100), \sigma_\tau \sim U[0,5000]$ |
| 10 | $\tau \sim N(0,100), \sigma_\tau \sim U[0,5000]$ |

I consider the following 10 options for the full joint model that produces the main results in the paper:

| Prior Choice Index | Joint Model Prior Specification |
|---|---|
| 1 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}100^2 & 0\\ 0 & 100^2\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,5000]\ \forall\ k$<br>$\theta \sim Cauchy(0,5), \Omega \sim LKJcorr(1).$ |
| 2 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}500^2 & 0\\ 0 & 500^2\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,5000]\ \forall\ k$<br>$\theta \sim Cauchy(0,5), \Omega \sim LKJcorr(1).$ |
| 3 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}1000^2 & 0\\ 0 & 1000^2\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,7000]\ \forall\ k$<br>$\theta \sim Cauchy(0,10), \Omega \sim LKJcorr(1).$ |
| 4 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}10000 & -5000\\ -5000 & 10000\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,7000]\ \forall\ k$<br>$\theta \sim Cauchy(0,10), \Omega \sim LKJcorr(2).$ |
| 5 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}1000000 & -500000\\ -500000 & 1000000\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,10000]\ \forall\ k$<br>$\theta \sim Cauchy(0,10), \Omega \sim LKJcorr(2).$ |
| 6 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}10000 & 5000\\ 5000 & 10000\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,10000]\ \forall\ k$<br>$\theta \sim Cauchy(0,15), \Omega \sim LKJcorr(3).$ |
| 7 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}250000 & 125000\\ 125000 & 250000\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,15000]\ \forall\ k$<br>$\theta \sim Cauchy(0,15), \Omega \sim LKJcorr(4).$ |
| 8 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}1000000 & 500000\\ 500000 & 1000000\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,15000]\ \forall\ k$<br>$\theta \sim Cauchy(0,20), \Omega \sim LKJcorr(5).$ |
| 9 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}1000000 & 250000\\ 250000 & 1000000\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,20000]\ \forall\ k$<br>$\theta \sim Cauchy(0,20), \Omega \sim LKJcorr(10).$ |
| 10 | $\begin{pmatrix}\mu\\ \tau\end{pmatrix} \sim N\left(\begin{pmatrix}0\\ 0\end{pmatrix}, \begin{bmatrix}1000000 & -250000\\ -250000 & 1000000\end{bmatrix}\right)$<br>$\sigma_{yk} \sim U[0,20000]\ \forall\ k$<br>$\theta \sim Cauchy(0,20), \Omega \sim LKJcorr(25).$ |

Table B.5: Sensitivity of inference on treatment effects to prior choice in the Rubin model

| | | **Prior Choice Index (refer to table for specific priors)** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome** | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Profit | $\hat{\tau}$ | 6.969 | 7.178 | 6.762 | 7.243 | 7.377 | 7.406 | 6.986 | 6.980 | 7.200 | 7.364 |
| | $\hat{se}_\tau$ | 7.580 | 7.645 | 7.800 | 7.965 | 8.072 | 8.049 | 7.587 | 7.600 | 7.957 | 7.923 |
| Revenues | $\hat{\tau}$ | 17.119 | 17.261 | 18.539 | 18.505 | 18.856 | 19.234 | 16.992 | 16.449 | 18.482 | 18.477 |
| | $\hat{se}_\tau$ | 13.882 | 13.858 | 15.180 | 15.771 | 16.510 | 16.698 | 14.185 | 14.067 | 15.689 | 15.861 |
| Expenditures | $\hat{\tau}$ | 7.929 | 7.960 | 8.122 | 8.168 | 8.240 | 8.099 | 7.924 | 7.908 | 8.149 | 8.085 |
| | $\hat{se}_\tau$ | 7.687 | 7.609 | 7.970 | 8.023 | 8.221 | 8.093 | 7.632 | 7.685 | 8.059 | 8.036 |
| Consumption | $\hat{\tau}$ | 5.229 | 5.191 | 5.360 | 5.355 | 5.496 | 5.506 | 5.284 | 5.277 | 5.481 | 5.373 |
| | $\hat{se}_\tau$ | 8.196 | 8.759 | 9.245 | 9.437 | 10.454 | 10.669 | 8.750 | 8.826 | 9.587 | 9.715 |
| Durables | $\hat{\tau}$ | 1.953 | 1.941 | 2.002 | 2.000 | 1.968 | 2.063 | 1.976 | 1.928 | 1.996 | 1.991 |
| | $\hat{se}_\tau$ | 6.260 | 6.113 | 6.991 | 9.039 | 11.179 | 14.276 | 7.112 | 7.025 | 9.453 | 9.259 |
| Temptation | $\hat{\tau}$ | -0.731 | -0.731 | -0.733 | -0.727 | -0.721 | -0.735 | -0.731 | -0.705 | -0.725 | -0.702 |
| | $\hat{se}_\tau$ | 1.422 | 1.450 | 1.513 | 1.538 | 1.475 | 1.459 | 1.460 | 1.404 | 1.525 | 1.358 |

Table B.6: Sensitivity of inference on heterogeneity to prior choice in the Rubin model

| | | **Prior Choice Index (refer to table for specific priors)** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome** | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Profit | $\hat{\sigma_\tau}$ | 12.011 | 12.372 | 11.621 | 12.398 | 12.489 | 12.562 | 12.072 | 12.036 | 12.287 | 12.562 |
| | $\hat{se}_{\sigma_\tau}$ | 9.239 | 9.167 | 9.460 | 9.672 | 9.760 | 9.623 | 9.429 | 9.434 | 9.722 | 9.579 |
| Revenues | $\hat{\sigma_\tau}$ | 25.692 | 25.916 | 26.603 | 27.410 | 27.708 | 28.076 | 26.298 | 25.271 | 27.389 | 27.465 |
| | $\hat{se}_{\sigma_\tau}$ | 16.964 | 16.929 | 17.247 | 20.466 | 20.899 | 21.082 | 19.541 | 19.595 | 20.191 | 20.522 |
| Expenditures | $\hat{\sigma_\tau}$ | 11.942 | 12.024 | 12.150 | 12.223 | 12.375 | 12.090 | 12.028 | 12.050 | 12.277 | 12.125 |
| | $\hat{se}_{\sigma_\tau}$ | 12.753 | 13.084 | 13.402 | 15.599 | 16.853 | 17.253 | 14.854 | 15.062 | 16.171 | 16.422 |
| Consumption | $\hat{\sigma_\tau}$ | 11.646 | 12.984 | 12.829 | 12.898 | 13.769 | 13.814 | 12.640 | 12.617 | 12.983 | 13.122 |
| | $\hat{se}_{\sigma_\tau}$ | 3.967 | 3.942 | 5.207 | 5.397 | 5.305 | 6.563 | 6.352 | 7.133 | 7.206 | 7.309 |
| Durables | $\hat{\sigma_\tau}$ | 6.600 | 6.391 | 6.839 | 8.024 | 8.682 | 9.352 | 7.632 | 7.438 | 8.394 | 8.425 |
| | $\hat{se}_{\sigma_\tau}$ | 10.495 | 10.313 | 11.118 | 19.033 | 21.262 | 26.902 | 17.475 | 16.990 | 22.288 | 21.588 |
| Temptation | $\hat{\sigma_\tau}$ | 2.057 | 2.080 | 2.070 | 2.072 | 2.059 | 2.084 | 2.056 | 1.981 | 2.047 | 1.927 |
| | $\hat{se}_{\sigma_\tau}$ | 2.191 | 2.219 | 2.290 | 2.407 | 2.299 | 2.241 | 2.218 | 2.213 | 2.400 | 2.198 |

Table B.7: Sensitivity of inference on treatment effects to prior choice in the joint model

| | | **Prior Choice Index (refer to table for specific priors)** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome** | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Profit | $\hat{\tau}$ | 7.002 | 8.093 | 10.338 | 6.941 | 7.472 | 7.725 | 7.223 | 7.410 | 7.068 | 6.656 |
| | $\hat{se}_{\tau}$ | 8.389 | 9.206 | 10.430 | 7.406 | 8.307 | 7.911 | 7.690 | 7.884 | 7.470 | 7.192 |
| Revenues | $\hat{\tau}$ | 11.686 | 14.713 | 17.997 | 12.757 | 15.331 | 15.187 | 15.791 | 16.633 | 14.687 | 16.140 |
| | $\hat{se}_{\tau}$ | 9.685 | 13.610 | 15.406 | 10.181 | 12.534 | 11.489 | 12.410 | 12.948 | 12.986 | 12.359 |
| Expenditures | $\hat{\tau}$ | 5.575 | 5.619 | 7.798 | 6.448 | 6.900 | 7.326 | 7.340 | 7.635 | 7.609 | 7.499 |
| | $\hat{se}_{\tau}$ | 5.244 | 6.477 | 8.106 | 5.683 | 6.700 | 6.406 | 6.721 | 7.056 | 6.847 | 6.732 |
| Consumption | $\hat{\tau}$ | 3.583 | 3.458 | 3.432 | 3.230 | 3.340 | 4.190 | 3.523 | 3.538 | 3.612 | 3.555 |
| | $\hat{se}_{\tau}$ | 2.191 | 3.151 | 4.718 | 2.994 | 3.760 | 3.582 | 3.980 | 4.559 | 4.482 | 4.306 |
| Durables | $\hat{\tau}$ | 1.819 | 1.837 | 2.023 | 1.899 | 1.940 | 1.989 | 1.999 | 2.020 | 1.988 | 1.960 |
| | $\hat{se}_{\tau}$ | 2.191 | 3.151 | 4.718 | 2.994 | 3.760 | 3.582 | 3.980 | 4.559 | 4.482 | 4.306 |
| Temptation | $\hat{\tau}$ | -0.793 | -0.803 | -0.818 | -0.796 | -0.805 | -0.799 | -0.797 | -0.803 | -0.785 | -0.790 |
| | $\hat{se}_{\tau}$ | 1.021 | 1.025 | 1.174 | 1.162 | 1.172 | 1.239 | 1.228 | 1.259 | 1.258 | 1.261 |

Table B.8: Sensitivity of inference on heterogeneity to prior choice in the joint model

| | | **Prior Choice Index (refer to table for specific priors)** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Outcome** | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Profit | $\hat{\sigma_{\tau}}$ | 10.451 | 10.768 | 14.000 | 10.507 | 10.164 | 11.211 | 10.310 | 10.839 | 10.588 | 10.149 |
| | $\hat{se}_{\sigma_{\tau}}$ | 9.777 | 9.651 | 10.792 | 8.097 | 8.161 | 8.208 | 7.592 | 7.973 | 7.550 | 7.426 |
| Revenues | $\hat{\sigma_{\tau}}$ | 16.308 | 15.896 | 19.699 | 15.830 | 16.180 | 17.892 | 17.195 | 18.575 | 16.641 | 18.125 |
| | $\hat{se}_{\sigma_{\tau}}$ | 14.768 | 14.283 | 15.607 | 11.910 | 11.949 | 12.343 | 12.008 | 12.530 | 12.769 | 12.187 |
| Expenditures | $\hat{\sigma_{\tau}}$ | 7.571 | 6.854 | 9.888 | 8.551 | 8.415 | 9.479 | 9.121 | 9.772 | 9.669 | 9.469 |
| | $\hat{se}_{\sigma_{\tau}}$ | 6.781 | 6.612 | 8.035 | 6.358 | 6.400 | 6.838 | 6.607 | 7.068 | 6.904 | 6.861 |
| Consumption | $\hat{\sigma_{\tau}}$ | 4.032 | 4.010 | 5.540 | 5.449 | 5.426 | 6.502 | 6.185 | 7.240 | 6.794 | 7.189 |
| | $\hat{se}_{\sigma_{\tau}}$ | 3.967 | 3.942 | 5.207 | 5.397 | 5.305 | 6.563 | 6.352 | 7.133 | 7.206 | 7.309 |
| Durables | $\hat{\sigma_{\tau}}$ | 3.182 | 3.198 | 4.570 | 3.750 | 3.745 | 4.151 | 4.136 | 4.532 | 4.424 | 4.260 |
| | $\hat{se}_{\sigma_{\tau}}$ | 3.718 | 3.930 | 5.463 | 4.434 | 4.513 | 5.252 | 5.260 | 6.082 | 6.123 | 5.984 |
| Temptation | $\hat{\sigma_{\tau}}$ | 1.559 | 1.570 | 1.779 | 1.748 | 1.770 | 1.849 | 1.828 | 1.871 | 1.844 | 1.854 |
| | $\hat{se}_{\sigma_{\tau}}$ | 1.276 | 1.269 | 1.568 | 1.544 | 1.544 | 1.698 | 1.693 | 1.769 | 1.782 | 1.780 |

## B.3 Ridge Procedure Robustness Checks

### B.3.1 Robustness to alternative definitions of variables and variable set contraction

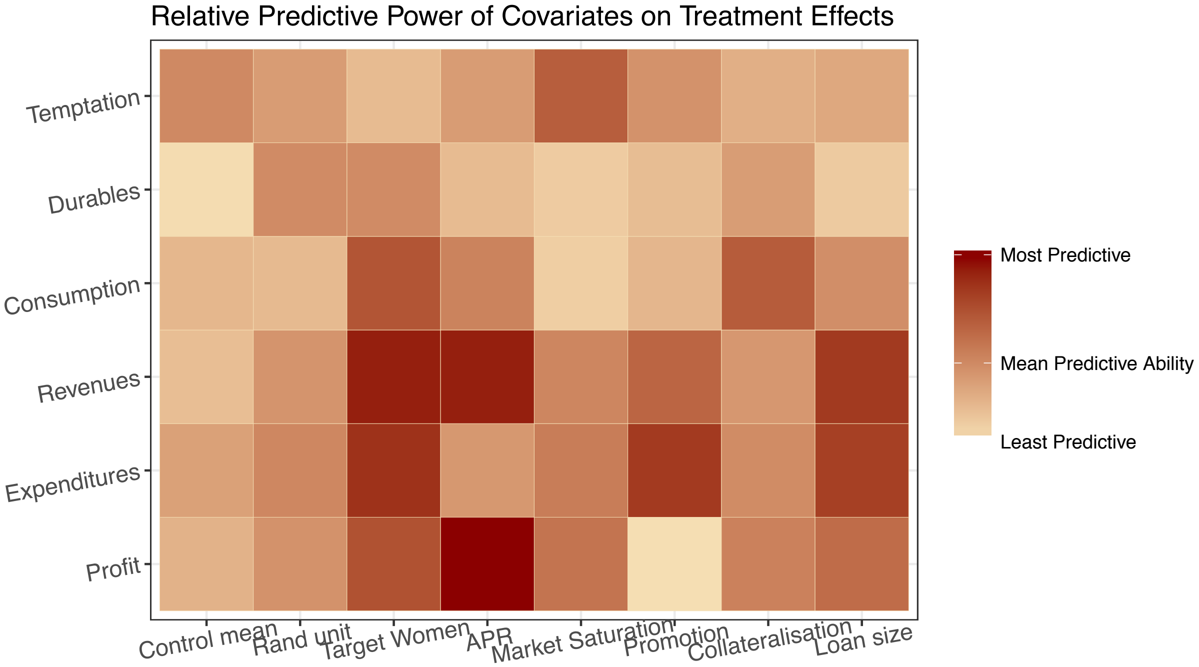

Figure B.1: Absolute magnitude of the Ridge regression coefficients for all outcomes and covariates when loan size enters as a percentage of the local annual income in the target area for the microlender. Results shown for ridge penalty of size 0.1, but are largely invariant to penalty size.

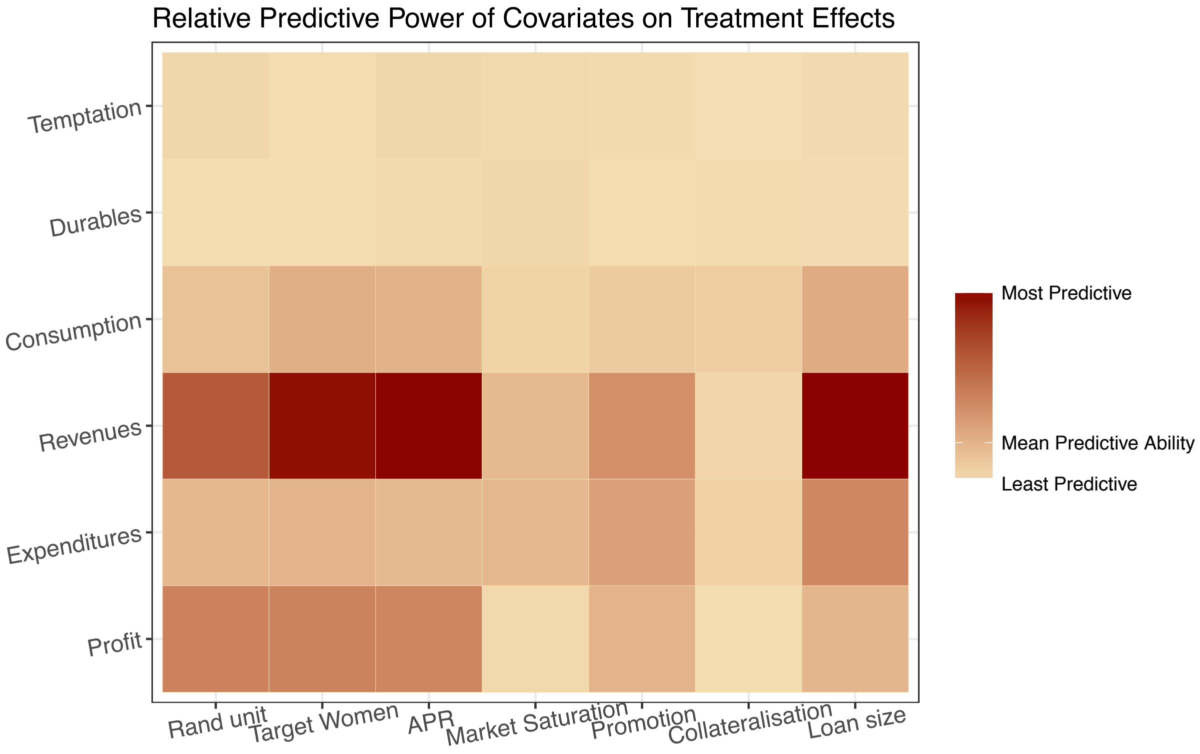

Figure B.2: Absolute magnitude of the full Bayesian Ridge regression coefficients for all outcomes and covariates, omitting the control group mean to show that the unit of randomization still does not emerge as a major predictor of the treatment effects.

### B.3.2 Can we quantify the predictive power of covariates in this setting?

In general, to understand whether policymakers should use information they have about the covariates in their setting to predict the likely impact of microcredit, it would help to know how much predictive power is generated by conditioning on the covariates. However, in this case, we cannot carry out this pure conditioning without overfitting: even restricting myself to a subset of all possible study-level contextual variables, I still have 7 important explanatory factors on which to regress the 7 treatment effect estimates. If I apply a simple linear regression model I will be able to fit the sample perfectly, with residuals all equal to zero, and therefore $R^2 = 1$. But this achievement will not reflect the predictive power of the covariates for the treatment effect; it will instead reflect a serious overfitting problem.

In the main text, I therefore confined myself to analysing the rank ordering of the relative importance of the covariates in a regression with a strong penalty on large coefficients, to prevent overfitting. It is natural to wish to quantify the predictive power of covariates, in addition to understanding their relative importance. Yet in an environment with 7 data points and 7 regressors, assessing the explanatory power of the regressors is likely to be a high-variance exercise in which the results are largely determined by noise. For this reason, I have relegated this section to an appendix. However, for the sake of illustrating this procedure and the resulting problems, I here describe one way to quantify the predictive power of covariates in this setting and show the results of this procedure on the microcredit data.

For ease of exposition, consider Ridge regression as described in Hastie et al (2009). Obviously, with a sufficiently large ridge penalty (in the Bayesian sense, a sufficiently strong prior of little explanatory power) the model will have zero explanatory power. With a sufficiently small ridge penalty, the model will have perfect explanatory power. How should the analyst choose the ridge penalty? The conventional frequentist answer is to use cross validation and choose the penalty size that has the smallest mean squared prediction error in the part of the sample left out of the analysis (called the "hold-out" sample). The procedure should then cycle through the sample so that all the data has its turn at being in the hold-out sample. As the results show, however, cross validation is affected by the same problems as regression in such a small sample: the variance of the procedure is so severe as to prevent firm conclusions.

I implement this procedure using leave-one-out (LOO) cross-validation which in this setting is identical to K-fold cross validation splitting the sample into 7 partitions. I test a sequence of Ridge penalties on the set [0,100000] incremented in units of 0.1. I then estimated the predicted treatment effects using the selected Ridge models for each of my 6 outcome variables. I scored the predictive power of the models by dividing the explained sum of squares by the total sum of squares, as in the $R^2$ metric. There are many alternative metrics of predictive power, and $R^2$ has many drawbacks, but in the Ridge setting all the variables have been standardised to have a mean equal to 0 and variance equal to 1, so its use in this case is more innocuous.

The results of this procedure are shown in the table below: at the Ridge penalties selected by the cross-validation procedure, the covariates have essentially been prohibited from influencing the model's predictions. The penalty selected was typically larger than 50, and this was in a context in which the variance of the covariates was 1. The covariates therefore are allocated zero predictive power on average. But, as cautioned above, this result is likely to reflect the small sample size, and the challenges of cross-validation in this setting, rather than the actual predictive power of these covariates. Unfortunately, we simply do not have enough data to quantify the predictive power of covariates for the microcredit treatment effects.

Table B.9: Predictive Power of Covariates in Ridge Regressions Tuned with Cross-Validation

| Variable | $R^2$ |
|---|---|
| Profit | 0.0010 |
| Expenditures | 0.0001 |
| Revenues | 0.0000 |
| Consumption | 0.0000 |
| Durables | 0.0000 |
| Temptation | 0.0000 |

Online Appendix 2 of 2

# "Understanding the Average Impact of Microcredit: A Bayesian Hierarchical Analysis of Seven Randomized Experiments"

Rachael Meager

# Appendix C

# Tables of Detailed Inputs and Outputs to the Analysis

**Online Appendix C for "Understanding the Average Impact of Microcredit: A Bayesian Hierarchical Analysis of Seven Randomized Experiments" by Rachael Meager**

## C.1 Data Description Table

Table C.1: Data Description Across All Sites in USD PPP per 2 weeks

| Statistic | N | Mean | St. Dev. | 25th percentile | Median | 75th percentile |
|---|---|---|---|---|---|---|
| Profit | 36,041 | 188.1 | 2,114.6 | 0.0 | 0.0 | 0.0 |
| Revenues | 40,267 | 153.4 | 833.8 | 0.0 | 0.0 | 28.7 |
| Expenditures | 40,267 | 106.0 | 715.9 | 0.0 | 0.0 | 10.0 |
| Consumption | 35,793 | 256.6 | 260.9 | 134.6 | 228.4 | 336.0 |
| Durables | 8,737 | 4,773.6 | 20,695.2 | 4.5 | 18.0 | 90.2 |
| Temptation | 30,706 | 12.8 | 21.8 | 1.1 | 4.8 | 16.8 |

There is a single outlying data point in the Mongolia data (Attanasio et al, 2015) that causes the mean of consumer durables to be pulled up to value that clearly does not represent the average. The authors of that study did not trim this data point so I have left it in to conform to their analysis as much as possible.

## C.2 Tables of Marginal Posteriors for the Main Specification

Full set of results for Profit:

| | mean | 2.5% | 25% | 50% | 75% | 97.5% |
|---|---|---|---|---|---|---|
| $\mu$ | 94.81 | -20.6 | 59.18 | 93.57 | 129.76 | 213.79 |
| $\tau$ | 6.81 | -3.03 | 1.82 | 5.37 | 10.38 | 24.49 |
| $\mu_1$ | 12.52 | 5.3 | 9.91 | 12.47 | 15.11 | 20.06 |
| $\tau_1$ | -0.77 | -10.96 | -3.68 | -0.48 | 2.36 | 8.18 |
| $\mu_2$ | -0.68 | -1.07 | -0.81 | -0.68 | -0.55 | -0.3 |
| $\tau_2$ | -0.34 | -0.77 | -0.49 | -0.33 | -0.18 | 0.1 |
| $\mu_3$ | 111.24 | 87.97 | 103.71 | 111.56 | 119.07 | 132.83 |
| $\tau_3$ | 11.27 | -4.6 | 2.66 | 8.71 | 17.52 | 39.93 |
| $\mu_4$ | 34.04 | 19.15 | 29.19 | 34.34 | 39.1 | 47.52 |
| $\tau_4$ | 8.09 | -4.54 | 2.09 | 6.77 | 12.98 | 26.9 |
| $\mu_5$ | 85.38 | 71.05 | 80.57 | 85.45 | 90.26 | 99.56 |
| $\tau_5$ | 9.04 | -3.82 | 2.63 | 7.7 | 14.32 | 28.32 |
| $\mu_6$ | 405.16 | 329.58 | 381.67 | 406.12 | 430.37 | 472.85 |
| $\tau_6$ | 15.01 | -11.79 | 1.79 | 9.44 | 22.88 | 71.11 |
| $\mu_7$ | 14.1 | 4.13 | 10.81 | 14.21 | 17.44 | 23.46 |
| $\tau_7$ | 5.29 | -4.98 | 1.22 | 4.6 | 9.03 | 18.24 |
| $\sigma_{y1}$ | 378.27 | 374.27 | 376.82 | 378.26 | 379.69 | 382.39 |
| $\sigma_{y2}$ | 3.08 | 2.94 | 3.03 | 3.07 | 3.12 | 3.22 |
| $\sigma_{y3}$ | 342.13 | 328.92 | 337.22 | 342.07 | 346.83 | 355.98 |
| $\sigma_{y4}$ | 489.49 | 481.24 | 486.58 | 489.46 | 492.36 | 497.86 |
| $\sigma_{y5}$ | 422.74 | 414.91 | 420.04 | 422.72 | 425.45 | 430.71 |
| $\sigma_{y6}$ | 1041.14 | 999.38 | 1026.14 | 1040.63 | 1056.03 | 1084.79 |
| $\sigma_{y7}$ | 220.16 | 214.7 | 218.26 | 220.1 | 222.03 | 225.82 |
| $\Omega_{11}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\Omega_{12}$ | 0.2 | -0.58 | -0.07 | 0.23 | 0.5 | 0.84 |
| $\Omega_{21}$ | 0.2 | -0.58 | -0.07 | 0.23 | 0.5 | 0.84 |
| $\Omega_{22}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\theta_1$ | 146.64 | 80.43 | 112.58 | 137.02 | 169.54 | 268.84 |
| $\theta_2$ | 9.35 | 1.66 | 4.39 | 7.67 | 12.26 | 27.38 |
| $V_{11}$ | 23982.21 | 6469.65 | 12674.01 | 18774.8 | 28745.47 | 72274.9 |
| $V_{12}$ | 319.52 | -838.72 | -51.43 | 181.18 | 570.83 | 2151.07 |
| $V_{21}$ | 319.52 | -838.72 | -51.43 | 181.18 | 570.83 | 2151.07 |
| $V_{22}$ | 136.25 | 2.77 | 19.29 | 58.89 | 150.3 | 749.71 |
| $\mu_{K+1}$ | 93.75 | -234.71 | -4.12 | 92.62 | 191.91 | 424.15 |
| $\tau_{K+1}$ | 6.89 | -15.7 | -0.41 | 4.49 | 12.35 | 40.04 |

Table C.2: Parameter vector elements ordered alphabetically by author surname as follows: 1 = Angelucci et al. 2015 (Mexico), 2 = Attanasio et al. 2015 (Mongolia), 3 = Augsberg et al. 2015 (Bosnia), 4 = Banerjee et al. 2015 (India), 5 = Crepon et al. 2015 (Morocco), 6 = Karlan and Zinman 2011 (Philippines), 7 = Tarozzi et al. 2015 (Ethiopia)). The columns are in order as follows: the posterior mean, then the $\{2.5, 25, 50, 75, 97.5\}\%$ quantiles of the posterior distribution. All $\hat{R}$ values are less than 1.1 indicating good mixing between chains.

Full set of results for Revenues:

| | mean | 2.5% | 25% | 50% | 75% | 97.5% |
|---|---|---|---|---|---|---|
| $\mu$ | 306.17 | -87.46 | 185.89 | 307.29 | 428.43 | 696.44 |
| $\tau$ | 14.45 | -1.4 | 6.58 | 12.13 | 19.93 | 43.53 |
| $\mu_1$ | 45.03 | 39.02 | 42.92 | 44.99 | 47.09 | 51.43 |
| $\tau_1$ | 9.36 | 0.73 | 6.57 | 9.41 | 12.25 | 17.59 |
| $\mu_2$ | 1.05 | 0.76 | 0.95 | 1.05 | 1.16 | 1.35 |
| $\tau_2$ | -0.07 | -0.41 | -0.18 | -0.07 | 0.05 | 0.28 |
| $\mu_3$ | 185.16 | 142.49 | 170.94 | 185.42 | 199.26 | 227.07 |
| $\tau_3$ | 21.33 | -4.43 | 7.58 | 16.67 | 30.76 | 71.28 |
| $\mu_4$ | 208.88 | 172.23 | 196.54 | 209.04 | 221.51 | 244.39 |
| $\tau_4$ | 14.78 | -10.36 | 4.54 | 12.19 | 22.73 | 51.66 |
| $\mu_5$ | 332.34 | 300.85 | 322.4 | 332.87 | 342.8 | 360.67 |
| $\tau_5$ | 25.04 | -1.25 | 10.71 | 21.05 | 36.02 | 70.68 |
| $\mu_6$ | 1432.05 | 1281.01 | 1382.19 | 1432.74 | 1483.16 | 1578.58 |
| $\tau_6$ | 20.64 | -24.63 | 3.55 | 14.66 | 31.87 | 98.07 |
| $\mu_7$ | 26.19 | 15.49 | 22.54 | 26.3 | 29.89 | 36.69 |
| $\tau_7$ | 10.26 | -2.59 | 5.4 | 9.99 | 14.87 | 24.6 |
| $\sigma_{y1}$ | 276.33 | 273.38 | 275.29 | 276.34 | 277.37 | 279.33 |
| $\sigma_{y2}$ | 2.42 | 2.31 | 2.38 | 2.42 | 2.45 | 2.53 |
| $\sigma_{y3}$ | 637.45 | 612.49 | 628.43 | 637.14 | 646.2 | 663.8 |
| $\sigma_{y4}$ | 1372.56 | 1349.97 | 1364.52 | 1372.38 | 1380.68 | 1395.55 |
| $\sigma_{y5}$ | 891.33 | 874.85 | 885.55 | 891.32 | 897.01 | 908.61 |
| $\sigma_{y6}$ | 2374.1 | 2279.02 | 2338.83 | 2373.71 | 2407.68 | 2475.84 |
| $\sigma_{y7}$ | 225.62 | 220.06 | 223.73 | 225.58 | 227.5 | 231.14 |
| $\Omega_{11}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\Omega_{12}$ | 0.13 | -0.59 | -0.14 | 0.15 | 0.41 | 0.78 |
| $\Omega_{21}$ | 0.13 | -0.59 | -0.14 | 0.15 | 0.41 | 0.78 |
| $\Omega_{22}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\theta_1$ | 521.33 | 300.62 | 407.33 | 488.99 | 595.67 | 942.13 |
| $\theta_2$ | 14.98 | 3.02 | 7.4 | 12.03 | 19.29 | 43.64 |
| $V_{11}$ | 300053.45 | 90370.01 | 165914.61 | 239111 | 354826.33 | 887616.37 |
| $V_{12}$ | 1050.6 | -6150.13 | -677.52 | 651.58 | 2385.41 | 10298.03 |
| $V_{21}$ | 1050.6 | -6150.13 | -677.52 | 651.58 | 2385.41 | 10298.03 |
| $V_{22}$ | 343.41 | 9.1 | 54.73 | 144.83 | 372.08 | 1904.23 |
| $\mu_{K+1}$ | 304.8 | -873.74 | -45.89 | 302.79 | 657.91 | 1461.35 |
| $\tau_{K+1}$ | 14.4 | -21.61 | 2.58 | 11.04 | 23.07 | 67.18 |

Table C.3: Parameter vector elements ordered alphabetically by author surname as follows: 1 = Angelucci et al. 2015 (Mexico), 2 = Attanasio et al. 2015 (Mongolia), 3 = Augsberg et al. 2015 (Bosnia), 4 = Banerjee et al. 2015 (India), 5 = Crepon et al. 2015 (Morocco), 6 = Karlan and Zinman 2011 (Philippines), 7 = Tarozzi et al. 2015 (Ethiopia)). The columns are in order as follows: the posterior mean, then the $\{2.5, 25, 50, 75, 97.5\}\%$ quantiles of the posterior distribution. All $\hat{R}$ values are less than 1.1 indicating good mixing between chains.

Full set of results for Expenditures:

| | mean | 2.5% | 25% | 50% | 75% | 97.5% |
|---|---|---|---|---|---|---|
| $\mu$ | 212.58 | -83.92 | 124.88 | 213.75 | 298.43 | 503.32 |
| $\tau$ | 6.72 | -2.3 | 2.57 | 5.54 | 9.7 | 22.07 |
| $\mu_1$ | 34.84 | 26.51 | 32.13 | 34.93 | 37.63 | 42.63 |
| $\tau_1$ | 8.83 | -0.13 | 4.57 | 8.36 | 12.58 | 20.71 |
| $\mu_2$ | 1.73 | 1.19 | 1.54 | 1.73 | 1.91 | 2.26 |
| $\tau_2$ | 0.29 | -0.34 | 0.09 | 0.29 | 0.5 | 0.9 |
| $\mu_3$ | 69.45 | 46.4 | 61.55 | 69.4 | 77.39 | 91.62 |
| $\tau_3$ | 9.2 | -4.56 | 2.64 | 7.03 | 13.93 | 33.53 |
| $\mu_4$ | 172.12 | 141.77 | 161.64 | 172.16 | 182.83 | 201.92 |
| $\tau_4$ | 6.48 | -9.89 | 1.06 | 5.11 | 10.89 | 28.58 |
| $\mu_5$ | 194.17 | 174.09 | 187.73 | 194.6 | 200.84 | 212.92 |
| $\tau_5$ | 10.39 | -3.38 | 3.37 | 8.1 | 15.47 | 35.13 |
| $\mu_6$ | 1033.17 | 910.58 | 991.14 | 1032.69 | 1075.59 | 1156.42 |
| $\tau_6$ | 8.59 | -19.09 | -0.03 | 6.12 | 15.23 | 47.49 |
| $\mu_7$ | 12.8 | 10.4 | 12.01 | 12.8 | 13.62 | 15.17 |
| $\tau_7$ | 3.57 | 0.38 | 2.4 | 3.54 | 4.7 | 6.94 |
| $\sigma_{y1}$ | 392.84 | 388.59 | 391.39 | 392.88 | 394.34 | 396.98 |
| $\sigma_{y2}$ | 4.37 | 4.18 | 4.3 | 4.37 | 4.44 | 4.57 |
| $\sigma_{y3}$ | 365.97 | 352.03 | 360.83 | 365.88 | 370.99 | 381.11 |
| $\sigma_{y4}$ | 1208.67 | 1188.84 | 1201.45 | 1208.47 | 1215.66 | 1229.18 |
| $\sigma_{y5}$ | 639.14 | 627.49 | 635.03 | 639.21 | 643.13 | 651.03 |
| $\sigma_{y6}$ | 1984.82 | 1904.8 | 1955.37 | 1983.99 | 2013.98 | 2069.98 |
| $\sigma_{y7}$ | 48.42 | 47.22 | 48 | 48.41 | 48.84 | 49.68 |
| $\Omega_{11}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\Omega_{12}$ | 0.07 | -0.67 | -0.21 | 0.07 | 0.35 | 0.76 |
| $\Omega_{21}$ | 0.07 | -0.67 | -0.21 | 0.07 | 0.35 | 0.76 |
| $\Omega_{22}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\theta_1$ | 380.37 | 221.21 | 296.55 | 353.68 | 432.96 | 697.09 |
| $\theta_2$ | 8.13 | 1.44 | 3.98 | 6.67 | 10.58 | 23.5 |
| $V_{11}$ | 160925.99 | 48934.79 | 87943.11 | 125090.07 | 187458.5 | 485934.76 |
| $V_{12}$ | 228.66 | -2939.41 | -416.46 | 111.14 | 800.89 | 3893.86 |
| $V_{21}$ | 228.66 | -2939.41 | -416.46 | 111.14 | 800.89 | 3893.86 |
| $V_{22}$ | 101.66 | 2.08 | 15.85 | 44.47 | 111.89 | 552.33 |
| $\mu_{K+1}$ | 214.85 | -631.34 | -41.05 | 211.81 | 468.59 | 1071.89 |
| $\tau_{K+1}$ | 6.69 | -13.36 | 0.64 | 5.06 | 11.46 | 34.12 |

Table C.4: Parameter vector elements ordered alphabetically by author surname as follows: 1 = Angelucci et al. 2015 (Mexico), 2 = Attanasio et al. 2015 (Mongolia), 3 = Augsberg et al. 2015 (Bosnia), 4 = Banerjee et al. 2015 (India), 5 = Crepon et al. 2015 (Morocco), 6 = Karlan and Zinman 2011 (Philippines), 7 = Tarozzi et al. 2015 (Ethiopia)). The columns are in order as follows: the posterior mean, then the $\{2.5, 25, 50, 75, 97.5\}$% quantiles of the posterior distribution. All $\hat{R}$ values are less than 1.1 indicating good mixing between chains.

Full set of results for Consumption:

| | mean | 2.5% | 25% | 50% | 75% | 97.5% |
|---|---|---|---|---|---|---|
| $\mu$ | 281.8 | 226.11 | 266.44 | 281.99 | 296.82 | 340.51 |
| $\tau$ | 3.44 | -6.28 | 0.82 | 3.46 | 5.93 | 13.21 |
| $\mu_1$ | 299.48 | 294.26 | 297.74 | 299.47 | 301.15 | 304.64 |
| $\tau_1$ | 4.48 | -2.06 | 2.19 | 4.44 | 6.64 | 11.49 |
| $\mu_2$ | 310.69 | 280.94 | 300.57 | 310.55 | 320.78 | 339.16 |
| $\tau_2$ | 5.57 | -7.4 | 1.07 | 4.48 | 8.25 | 27 |
| $\mu_3$ | 195.89 | 174.11 | 188.51 | 196.06 | 203.37 | 217.33 |
| $\tau_3$ | 1.73 | -17.94 | -1.67 | 2.59 | 6.17 | 16.47 |
| $\mu_4$ | 276.79 | 270.01 | 274.52 | 276.83 | 279.02 | 283.32 |
| $\tau_4$ | 3.82 | -4.09 | 1.2 | 3.75 | 6.3 | 12.17 |
| $\mu_5$ | 325.15 | 317.29 | 322.67 | 325.06 | 327.69 | 332.77 |
| $\tau_5$ | 1.44 | -8.71 | -1.26 | 1.8 | 4.58 | 9.59 |
| $\sigma_{y1}$ | 262.18 | 259.21 | 261.2 | 262.19 | 263.14 | 265.09 |
| $\sigma_{y2}$ | 444.06 | 424.74 | 437.35 | 444.02 | 450.72 | 463.98 |
| $\sigma_{y3}$ | 302.02 | 289.19 | 297.34 | 301.81 | 306.66 | 315.31 |
| $\sigma_{y4}$ | 226.13 | 222.43 | 224.8 | 226.12 | 227.41 | 229.97 |
| $\sigma_{y5}$ | 222.94 | 218.82 | 221.52 | 222.93 | 224.37 | 227.08 |
| $\Omega_{11}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\Omega_{12}$ | 0.02 | -0.69 | -0.27 | 0.02 | 0.29 | 0.74 |
| $\Omega_{21}$ | 0.02 | -0.69 | -0.27 | 0.02 | 0.29 | 0.74 |
| $\Omega_{22}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\theta_1$ | 56.02 | 28.42 | 41.42 | 51.23 | 63.98 | 113.85 |
| $\theta_2$ | 5.55 | 0.75 | 2.12 | 4.07 | 7.15 | 19.07 |
| $V_{11}$ | 3677.94 | 807.93 | 1715.51 | 2624.56 | 4093.89 | 12961.37 |
| $V_{12}$ | 7.79 | -317.28 | -45.19 | 2.4 | 55.06 | 363.04 |
| $V_{21}$ | 7.79 | -317.28 | -45.19 | 2.4 | 55.06 | 363.04 |
| $V_{22}$ | 60.38 | 0.56 | 4.5 | 16.53 | 51.14 | 363.68 |
| $\mu_{K+1}$ | 281.91 | 146.46 | 244.37 | 281.64 | 319.68 | 415.24 |
| $\tau_{K+1}$ | 3.45 | -14.45 | -0.28 | 3.49 | 7.03 | 21.56 |

Table C.5: Parameter vector elements ordered alphabetically by author surname as follows: 1 = Angelucci et al. 2015 (Mexico), 2 = Attanasio et al. 2015 (Mongolia), 3 = Augsberg et al. 2015 (Bosnia), 4 = Banerjee et al. 2015 (India), 5 = Crepon et al. 2015 (Morocco)). The columns are in order as follows: the posterior mean, the $\{2.5, 25, 50, 75, 97.5\}\%$ quantiles of the posterior distribution. All $\hat{R}$ values are less than 1.1 indicating good mixing between chains.

Full set of results for Consumer Durables:

| | mean | 2.5% | 25% | 50% | 75% | 97.5% |
|---|---|---|---|---|---|---|
| $\mu$ | 274.31 | -317.48 | 107.71 | 287.34 | 459.81 | 818.9 |
| $\tau$ | 1.83 | -3.9 | 0.67 | 1.6 | 2.88 | 8.29 |
| $\mu_1$ | 5.34 | 4.52 | 5.09 | 5.34 | 5.62 | 6.15 |
| $\tau_1$ | 1.09 | 0.18 | 0.76 | 1.08 | 1.41 | 2.06 |
| $\mu_2$ | 1114.28 | 913.26 | 1049.05 | 1116.37 | 1179.95 | 1303.42 |
| $\tau_2$ | 1.87 | -12.06 | -0.16 | 1.49 | 3.89 | 16.54 |
| $\mu_3$ | 24.65 | 21.45 | 23.67 | 24.76 | 25.71 | 27.42 |
| $\tau_3$ | 2.89 | -0.33 | 1.43 | 2.61 | 4.15 | 7.28 |
| $\mu_4$ | 6.43 | 3.71 | 5.56 | 6.41 | 7.34 | 9.18 |
| $\tau_4$ | 1.52 | -1.89 | 0.51 | 1.44 | 2.53 | 5.1 |
| $\sigma_{y1}$ | 6.83 | 6.53 | 6.73 | 6.83 | 6.94 | 7.15 |
| $\sigma_{y2}$ | 2973.79 | 2853.39 | 2927.51 | 2972.68 | 3018.15 | 3113.24 |
| $\sigma_{y3}$ | 92.59 | 91.06 | 92.08 | 92.58 | 93.1 | 94.09 |
| $\sigma_{y4}$ | 83.56 | 82.11 | 82.99 | 83.55 | 84.12 | 85.17 |
| $\Omega_{11}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\Omega_{12}$ | 0.02 | -0.72 | -0.26 | 0.02 | 0.3 | 0.74 |
| $\Omega_{21}$ | 0.02 | -0.72 | -0.26 | 0.02 | 0.3 | 0.74 |
| $\Omega_{22}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\theta_1$ | 625.84 | 277.02 | 407.24 | 519.94 | 684.39 | 2122.43 |
| $\theta_2$ | 3.36 | 0.31 | 1.01 | 2.21 | 4.25 | 13.23 |
| $V_{11}$ | 562199.05 | 76741 | 165846.9 | 270342.64 | 468388.27 | 4504714.78 |
| $V_{12}$ | 18.6 | -2507.6 | -275.11 | 11.62 | 327.21 | 2526.88 |
| $V_{21}$ | 18.6 | -2507.6 | -275.11 | 11.62 | 327.21 | 2526.88 |
| $V_{22}$ | 26.89 | 0.1 | 1.02 | 4.88 | 18.02 | 174.98 |
| $\mu_{K+1}$ | 271.94 | -1287.38 | -116.5 | 275.42 | 669.17 | 1787.86 |
| $\tau_{K+1}$ | 1.85 | -9.21 | 0.11 | 1.52 | 3.53 | 13.67 |

Table C.6: Parameter vector elements ordered alphabetically by author surname as follows: 1 = Attanasio et al. 2015 (Mongolia), 2 = Augsberg et al. 2015 (Bosnia), 3 = Banerjee et al. 2015 (India), 4 = Crepon et al. 2015 (Morocco)). The columns are in order as follows: the posterior mean, then the $\{2.5, 25, 50, 75, 97.5\}\%$ quantiles of the posterior distribution. All $\hat{R}$ values are less than 1.1 indicating good mixing between chains.

Full set of results for Temptation Spending:

| | mean | 2.5% | 25% | 50% | 75% | 97.5% |
|---|---|---|---|---|---|---|
| $\mu$ | 18.64 | 3.9 | 14.51 | 18.7 | 22.81 | 33.09 |
| $\tau$ | -0.79 | -3.33 | -1.26 | -0.7 | -0.22 | 1.28 |
| $\mu_1$ | 4.69 | 4.56 | 4.64 | 4.69 | 4.73 | 4.82 |
| $\tau_1$ | -0.09 | -0.27 | -0.15 | -0.09 | -0.02 | 0.09 |
| $\mu_2$ | 8.28 | 5.42 | 7.44 | 8.33 | 9.18 | 10.8 |
| $\tau_2$ | 0.03 | -2.4 | -0.78 | -0.11 | 0.72 | 3.22 |
| $\mu_3$ | 31.7 | 28.44 | 30.53 | 31.61 | 32.81 | 35.36 |
| $\tau_3$ | -1.99 | -6.8 | -2.97 | -1.58 | -0.64 | 0.71 |
| $\mu_4$ | 15.79 | 14.92 | 15.5 | 15.8 | 16.08 | 16.63 |
| $\tau_4$ | -1.35 | -2.54 | -1.77 | -1.36 | -0.94 | -0.1 |
| $\mu_5$ | 32.03 | 31.08 | 31.71 | 32.04 | 32.35 | 32.96 |
| $\tau_5$ | -0.53 | -1.81 | -0.96 | -0.52 | -0.11 | 0.74 |
| $\sigma_{y1}$ | 6.05 | 5.99 | 6.03 | 6.05 | 6.08 | 6.12 |
| $\sigma_{y2}$ | 28.98 | 27.72 | 28.54 | 28.96 | 29.41 | 30.32 |
| $\sigma_{y3}$ | 44.28 | 42.41 | 43.57 | 44.25 | 44.95 | 46.33 |
| $\sigma_{y4}$ | 23.76 | 23.36 | 23.62 | 23.76 | 23.9 | 24.16 |
| $\sigma_{y5}$ | 26.79 | 26.3 | 26.62 | 26.79 | 26.96 | 27.29 |
| $\Omega_{11}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\Omega_{12}$ | -0.16 | -0.75 | -0.42 | -0.18 | 0.08 | 0.53 |
| $\Omega_{21}$ | -0.16 | -0.75 | -0.42 | -0.18 | 0.08 | 0.53 |
| $\Omega_{22}$ | 1 | 1 | 1 | 1 | 1 | 1 |
| $\theta_1$ | 15.02 | 7.77 | 10.82 | 13.51 | 17.4 | 31.15 |
| $\theta_2$ | 1.72 | 0.17 | 0.75 | 1.3 | 2.2 | 5.64 |
| $V_{11}$ | 266.32 | 60.37 | 116.98 | 182.43 | 302.87 | 970.36 |
| $V_{12}$ | -4.18 | -37.77 | -7.63 | -2.19 | 0.97 | 19.05 |
| $V_{21}$ | -4.18 | -37.77 | -7.63 | -2.19 | 0.97 | 19.05 |
| $V_{22}$ | 5.2 | 0.03 | 0.56 | 1.69 | 4.85 | 31.83 |
| $\mu_{K+1}$ | 18.67 | -16.59 | 8.57 | 18.66 | 28.7 | 54.17 |
| $\tau_{K+1}$ | -0.79 | -6.27 | -1.7 | -0.64 | 0.16 | 4.05 |

Table C.7: Parameter vector elements ordered alphabetically by author surname as follows: 1 = Angelucci et al. 2015 (Mexico), 2 = Attanasio et al. 2015 (Mongolia), 3 = Augsberg et al. 2015 (Bosnia), 4 = Banerjee et al. 2015 (India), 5 = Crepon et al. 2015 (Morocco)). The columns are in order as follows: the posterior mean, the $\{2.5, 25, 50, 75, 97.5\}\%$ quantiles of the posterior distribution. All $\hat{R}$ values are less than 1.1 indicating good mixing between chains.