

A Reproduction and Replication of “Hidden Income and the Perceived Returns to Migration” (Baseler 2023, AEJ:App)*

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Abstract

Baseler (2023) explores why low internal migration of workers from rural areas to cities persists in Kenya. Using two randomized field experiments, Baseler (2023) supports the claim that migration is suppressed by bad information and that the information problem is furthered by heads of households mis-reporting remittances of income. Marginal migration can have substantive effects on the quality of life of sending households. We were able to fully reproduce all analytical findings presented in the paper from each of the raw data sources using the scripts provided in the replication package. Our reproduced coefficients, standard errors, and p-values/statistical significance all matched the digits at which they were presented in the original study. We then test the robustness of the study to remove the Winsorization of outcome variables in the experimental data. This has the effect of changing coefficient magnitudes and statistical significance of some findings marginally, often in ways that make the findings stronger.

JEL CODES: **C93, J31, J61, J82, O15, O18, R23**

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1 Introduction

[Baseler \(2023\)](#) investigates information frictions as a cause of low rates of internal migration from rural areas to cities in developing countries. Information frictions may prevent rural workers from learning about the potential returns to migration, which leads to the underestimation of incomes in urban areas. The underestimation of incomes comes from strategic misrepresentation of incomes by urban workers, who are incentivized to do so because many send remittances back home. These information asymmetries prevent potential migrants in rural areas from optimizing where they live and work, which may potentially explain why, despite the lack of formal internal labor mobility restrictions, there exists low migration and sustained gaps between urban and rural incomes.

[Baseler \(2023\)](#) tested this hypothesis by conducting two randomized control trials among households in Kenya. The data comes from rural household surveys conducted from 2016 to 2019 and the 2005-2006 Kenya Integrated Household Budget Survey (KIHBS). In the first urban labour market experiment (henceforth “ULM”), a sample of 497 households located in rural West Kenya were surveyed. Households were randomly assigned information about urban labor markets in three major cities (Nairobi, Kisumu, and Eldoret), and were then asked about their beliefs on urban incomes, migration choices, and employment outcomes following treatment implementation and during follow-up surveys. In the second experiment on migrant remittances (henceforth the “MR experiment”), a sample of 4,994 households participated and had beliefs elicited about potential incomes in Nairobi, in which treated households were randomly informed about the remittance behavior of migrants.

We reproduce here the main findings of the paper, which were highlighted in Slide 3 of the [Presentation Slides](#) provided by the author on the publishing journal’s website:

1. People in rural areas underestimate big-city incomes (Figure 2)
2. Information provision changes beliefs about incomes in Nairobi and increases migration to Nairobi (RCT 1) (Table 2 and 3)
3. Current migrants under-report their income to friends/family (Figure 3)

4. This feeds directly into belief formulation in the village (RCT 2) (Table 5)
5. Remittance obligations generate the incentive to hide income (Figure 4)
6. Hidden income incentives predict gaps in beliefs (Table 4)

In this paper, we investigate whether the analytical results presented in the paper are computationally reproducible and further test their robustness to changes in how the data are processed prior to analysis.

2 Computational Reproducibility

We used the replication package made available through the American Economic Association [here](#). The replication package provided raw data from surveys conducted by the author and code to clean and process the data from raw to analysis forms. The replication package also provided instructions for the three datasets that needed to be downloaded from other sources by the user. These include the DHS-based migration data from [Young \(2013\)](#), the 2009 Kenya Population and Housing Census from IPUMS ([Minnesota Population Center 2020](#)), as well as data from the 2005-2006 Kenya Integrated Household Budget Survey (KIHBS). The Young/DHS and IPUMS data were both available to download according to the instructions provided by the author. We were unable to access the KIHBS data following the procedure indicated, but were able to locate what appear to be analogous datasets publicly available from the [KNBS Microdata Library](#).¹

Overall, we successfully computationally reproduced from raw data all results in the original manuscript and online appendix (i.e., Tables 1-5, A1-A10, D1-D9, E1-E3, Figures 1-4, C1, D1, E1-E3). See Table 1 for details.

¹We believe the KIHBS data accessible through the attached link to likely be slightly different from those used by [Baseler \(2023\)](#) since the access process is different than described in the Replication Materials, the filenames of the raw data are different than those referred to in the code from the Replication Materials, and a small number of 1:1 merges in the original code do not work without some type of adjustment to the data. This latter issue potentially only affects Figures 1 and E3, the sole analyses in the paper that used the KIHBS data. Specifically, Section R of the 2005-2006 KIHBS data we downloaded was structured to not be unique on the combination of the merge in variables “id_clust” and “id_hh”, causing a 1:1 merge to fail when running code file “`process_kihbs.do`”. To create Figures 1 and E3, we preprocessed KIHBS data Section R to keep only the first occurrence of a given household within those merge variables.

Table 1: Replication Package Contents and Reproducibility

Replication Package Item	Fully	Partial	No
Raw data provided (when from author)	✓		
Raw data available (when from external source)	✓		
Analysis data provided			✓
Cleaning code provided	✓		
Analysis code provided	✓		
Reproducible from raw data	✓		
Reproducible from analysis data	✓		

3 Reproduction of Analytical Results

[Baseler \(2023\)](#) elucidates many effects of migration and information transparency from his experiment, and includes treatment effects of migration across urban centers in Kenya. For the treatment of providing information on the costs and benefits of migration, the author designed information for the major cities of Nairobi, as well as smaller cities of Eldoret and Kisumu (Appendix B).

The treatment effects of the provision of information are shown in Table 2, where the reported intentions and beliefs towards migrating to cities revealed are different than those reported in the original baseline survey. [Baseler \(2023\)](#) includes detailed partial effects of attitudes towards more minor cities to show the economic and statistical significance of his intervention, but almost all of the tangible and significant effects are noticeable only in the major urban city of Nairobi.

In reference to his own paper and presentation slides, [Baseler \(2023\)](#) focuses on these significant results from Nairobi, showing clearly that there is an information barrier that affects migration from rural to urban areas.

3.1 Robustness Test: Sensitivity to Winsorization

Our first step in checking the robustness of the paper's original results laid in the fact that almost all of the results tables in the ULM RCT were generated using a dataset that was reportedly winsorized using 5% of nonzero values in both tails. The winsorization of nonzero values was originally performed to “..reduce the influence of outliers” by replacing values using certain percentiles rather than truncat-

ing/trimming data ([Baseler 2023](#), p.335). This choice of data censoring was worth investigating to find how treatment effects may have varied in the full sample. We would like to briefly note that in the available replication code, there are also several other variables not specifically described in the paper that were not winsorized at the 5% tails of the nonzero values. Instead, they were winsorized at the 1% tails of the full distribution (`create_dataset.do`, line 2652, 2517).

We instead decided to reproduce the original article's main tables without any such data truncation to see how results change when using the full data sample. The produced results can be seen in Appendix [6.1](#). In Table F2, without winsorization, 13 coefficients are statistically significant at the 10% significance level, whereas 11 are statistically significant with winsorization. Noticeably, p-values have not gotten smaller for coefficients under "Overall Outcomes" and fluctuated slightly for coefficients under "Specific Destination Outcomes".

In Table F3, without winsorization, all 7 coefficients are statistically significant at the 10% significance level, whereas only 5 are statistically significant with winsorization. In this instance, winsorization produces more conservative results. Lastly, in Table F4, without winsorization, 13 coefficients are statistically significant at the 10% significance level, whereas 14 are statistically significant without winsorization with slight fluctuations in p-values in both directions.

3.2 Revision of the first RCT with Tobit model

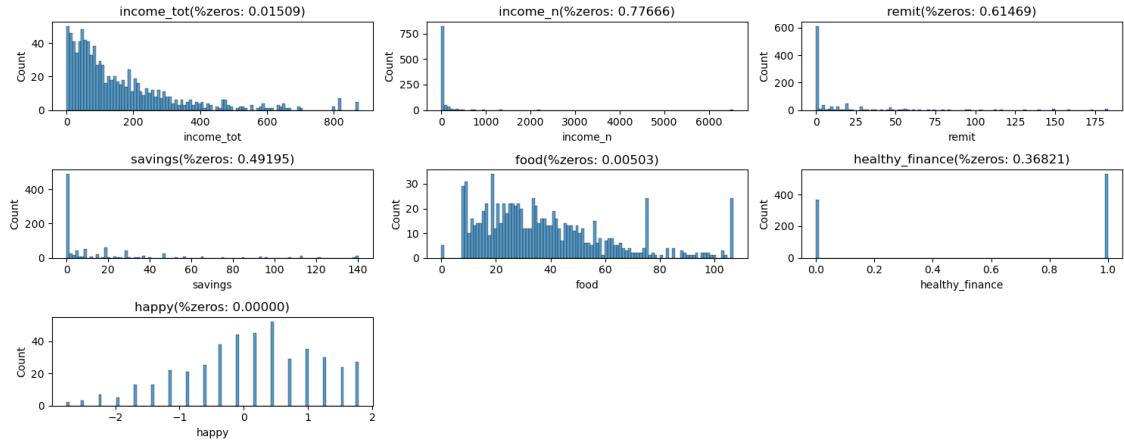
Table 2: ULM Information Increases Total Reported Income and Financial Well-Being (Reproduction of Table 3 in [Baseler \(2023\)](#))

	Orig Coef	PDS Coef	Tobit Coef	Control Mean	N
Total Income	32.674 (10.374) [0.002]	32.874 (10.146) [0.001]	24.910 (7.738) [0.001]	139.951	939
Income Earned in Nairobi	31.942 (16.163) [0.048]	31.821 (17.245) [0.065]	108.360 (70.420) [0.124]	20.479	939
Remittances to Origin Household	2.609 (2.065) [0.212]	2.484 (1.995) [0.213]	4.598 (3.690) [0.213]	10.001	896
Savings	2.628 (2.023) [0.194]	1.911 (1.971) [0.332]	0.591 (2.141) [0.783]	12.353	896
Food Expenditure	3.265 (1.713) [0.057]	2.478 (1.657) [0.135]	1.566 (1.034) [0.130]	35.836	896
Reports Healthy Finances = 1	0.091 (0.035) [0.008]	0.077 (0.033) [0.021]		0.546	896
Mental Health (MHI-5) Index at Origin	0.243 (0.097) [0.012]	0.226 (0.098) [0.021]	0.149 (0.073) [0.040]	-0.000	435

P-values are presented in square brackets and household-clustered standard errors are presented in parentheses. Column 1 presents the results from the original paper [Baseler \(2023\)](#), which employs `pdslasso` command in STATA to perform Post-Double Lasso. Column 2 presents the reproduced results by using `sklearn` Lasso and logistic regression (when regressing treatment on covariates) with L1 regularization and `liblinear` solver, both with 10-fold cross-validation. Column 3 presents the result from the Tobit model with bootstrapped standard errors in the square brackets. We did not estimate the effect on financial health outcomes because it is a binary variable, which is not an appropriate outcome for Tobit.

Another major robustness test we have done for this paper is replicating Table 3 using Tobit and redoing the Post-Double Selection from scratch in Python. There are two main reasons that we would like to do this test: first, we noticed that the documentation of `pdslasso` command in STATA does not specify the default setting for hyperparameter tuning for lasso when the command itself does not offer any option for choosing such as max iterations, n-fold cross-validation, and solver. It also does not mention any imputation method, even though we appeared to drop more observations than the original paper (though this could be a result of our

Figure 1: Distributions of outcome variables in Table 3 of Baseler 2023



selection of different covariates, as `pdslasso` and `sklearn` may tune the hyperparameter differently). After dropping N/A for the outcome variable, we imputed the remaining missing values of the covariates by the averages, by which we were able to match the number of observations in Table 3 of the original paper.

Second, as the author pointed out in the paper, there is a significant amount of zeros in the outcome variables especially in the income-related outcomes. Linear models may result in biased coefficients by falsely extrapolating the values of the outcome variables below zero given the actual range of the outcomes. Tobit model renders this into a binary problem where we estimate coefficients of a latent utility function by maximizing the likelihood of the latent variable $y^* = x^\top \beta + \epsilon$ given the observed data $y = \max(0, y^*)$ (Tobin 1958). Under the assumption that the latent variable is normally distributed and homoskedastic, we estimate the coefficient by solving the following optimization problem:

$$\begin{aligned} \beta &= \arg \max_{\beta} \mathcal{L}(\beta, \sigma) \\ \mathcal{L}(\beta, \sigma) &= \sum_{i=1}^N \left[\mathbf{1}(y_i = 0) \log(1 - \Phi(x_i^\top \beta)) \right. \\ &\quad \left. + \mathbf{1}(y_i > 0) \log\left(\frac{1}{\sigma} \phi\left(\frac{y_i - x_i^\top \beta}{\sigma}\right)\right) \right] \end{aligned}$$

We calculated the average of the partial effect for each observation as the estimate of the treatment for each outcome, except for the binary outcome for financial health, in the third column of Table 2 by taking the average of the derivative

$\frac{\delta E[y|x_1, \dots, x_k]}{\delta x_j}$ after running the Tobit model. Column 2 shows the results of post-double selection performed in Python using the `sklearn` logistic regression with L1 penalty and `liblinear` solver (when regressing treatment on covariates) and lasso, both with 10-fold cross-validation. We can notice that columns 1 and 2 do have some small discrepancies, including; the number of significant results decreases from 4 to 3 at 5% significance level, while the direction of the effect remains the same. However, compared to column 3, the treatment effect changes more drastically, especially for the outcomes (`income_n`, `remit`, and `savings`) composed of the highest proportion of zeros in Figure 1, whereas other variables with a lower proportion of zeros (except the binary outcome for financial health) have experienced much smaller changes compared to the other two columns, such discrepancy could be indicative of the potential biasedness of linear models when applied to a sample composed of a high proportion of zeros.

4 Conclusion

To conclude, the findings of this study shed light on crucial aspects of rural-urban migration dynamics in developing economies. Despite the substantial income disparity between urban and rural areas, many rural workers do not migrate to cities, largely due to a systemic underestimation of urban incomes. The research conducted in Kenya demonstrates that this underestimation is sustained by a strong incentive, remittance obligation, effectively acting as a tax on incomes. By providing accurate information about urban earnings, this study reveals a significant increase in migration to the capital city, highlighting the potential impact of addressing information asymmetry in migration decision-making.

With few obstacles, replication of Baseler's findings was straightforward given the packages and data provided. Besides the subjective choices on data truncation in methodology and issues with handling high proportions of zero value in the sample, the findings were largely robust to extensions. We appreciate the scale of survey data and analysis required to confirm the effects of information in understanding migration and how migration to major cities drives much of that effect.

References

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5 Reproduction Figures

5.1 Paper Figure – Replication Versions

Figure 1: Villagers Underestimate Big-City Incomes

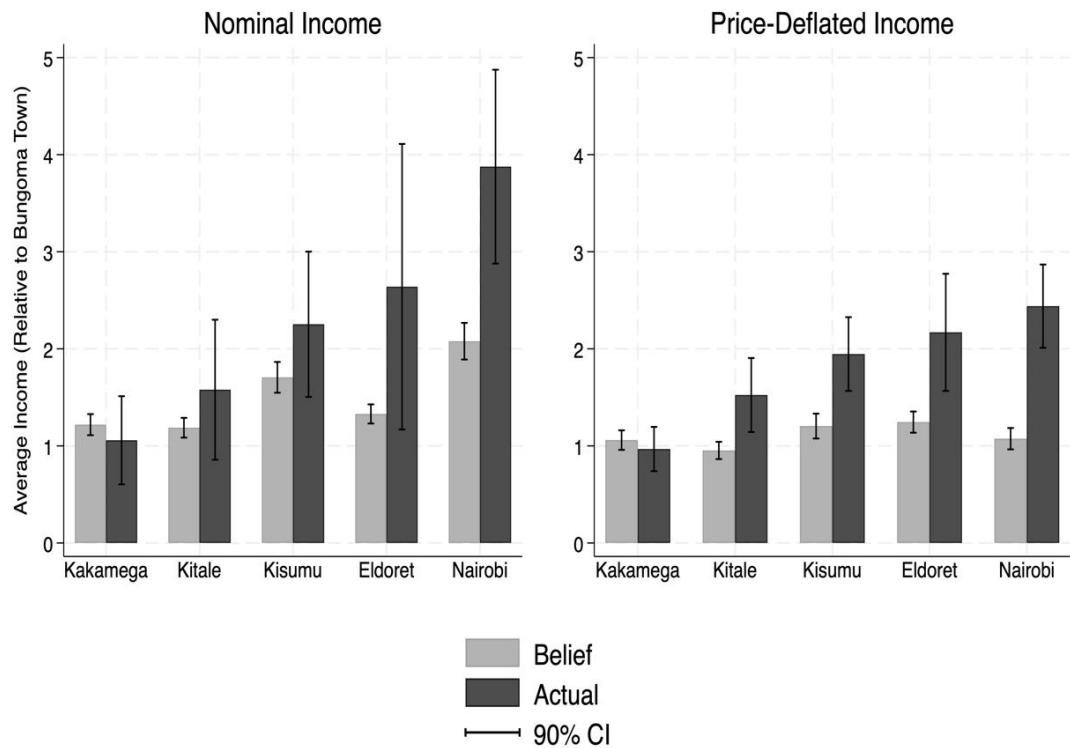
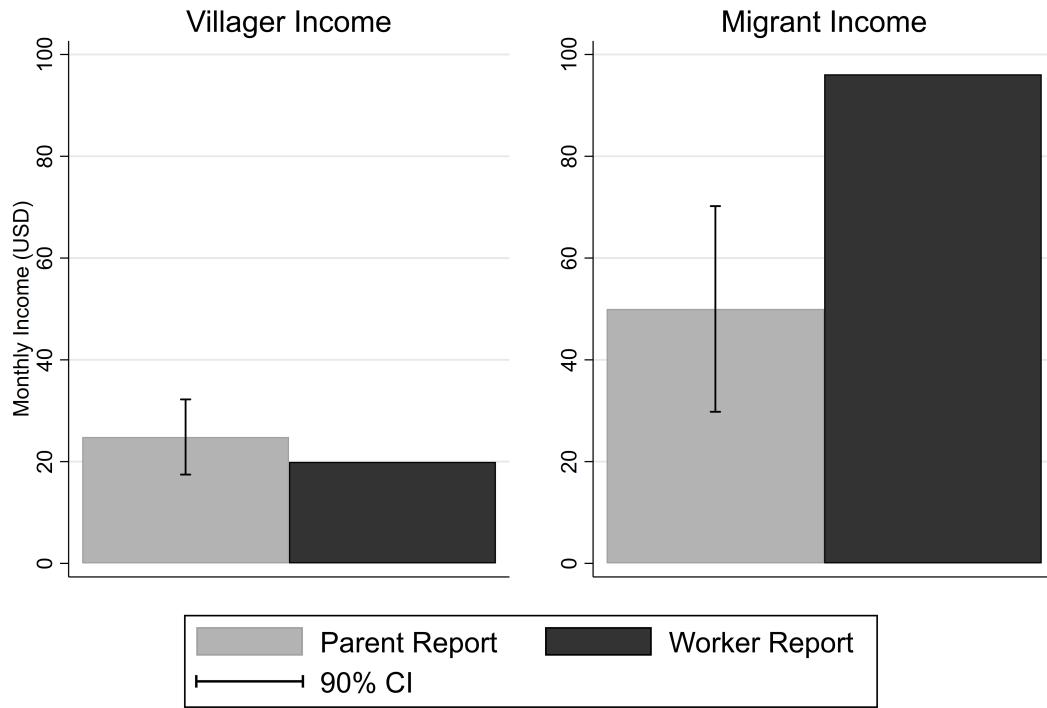


Figure 2: Migrants' Parents and Friends Underestimate Their Incomes

Panel A: Full Household Sample (N=281 workers)



Panel B: Network Sample (N=80 workers)

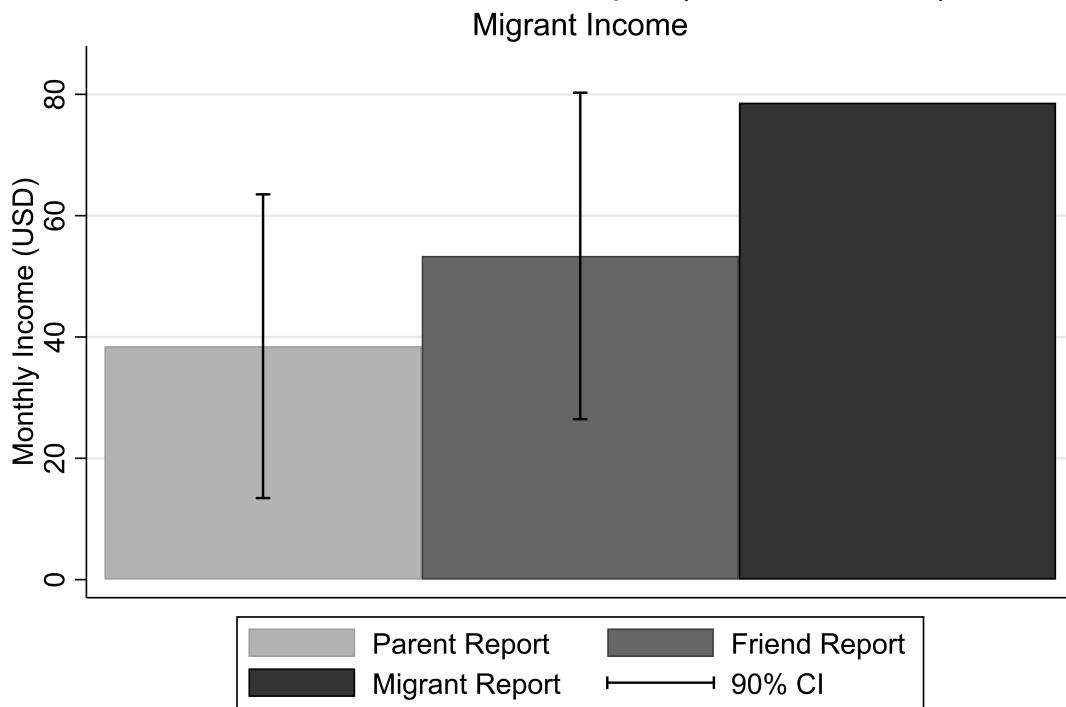


Figure 3: Simulated Time Series of Beliefs at the Origin

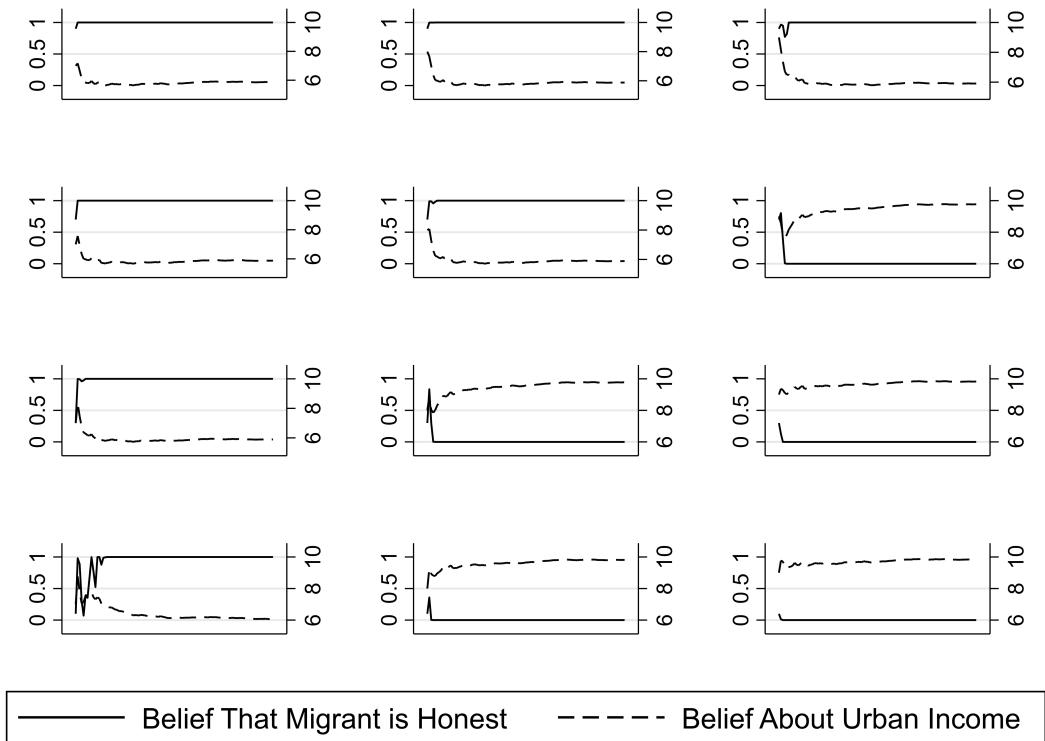
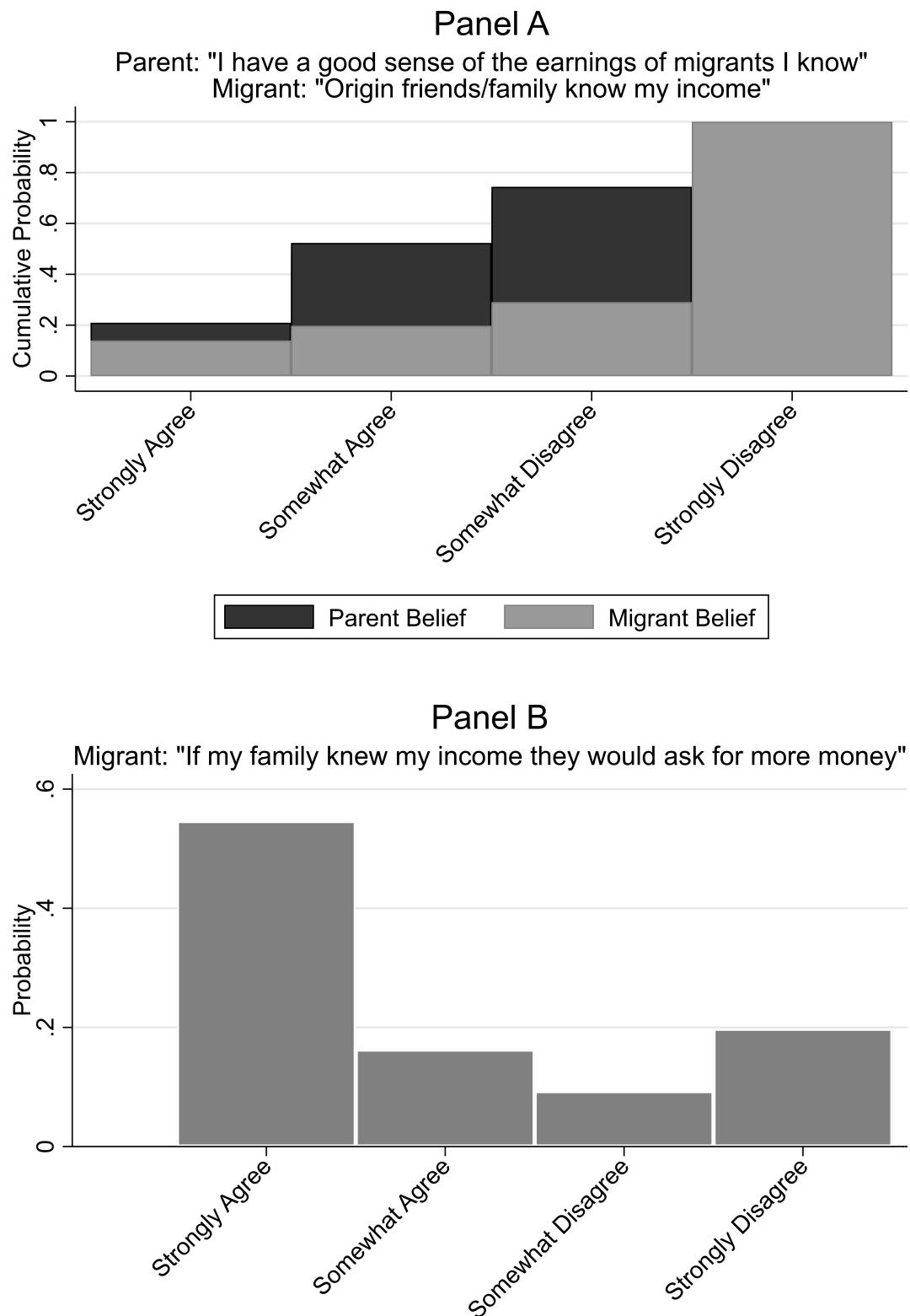
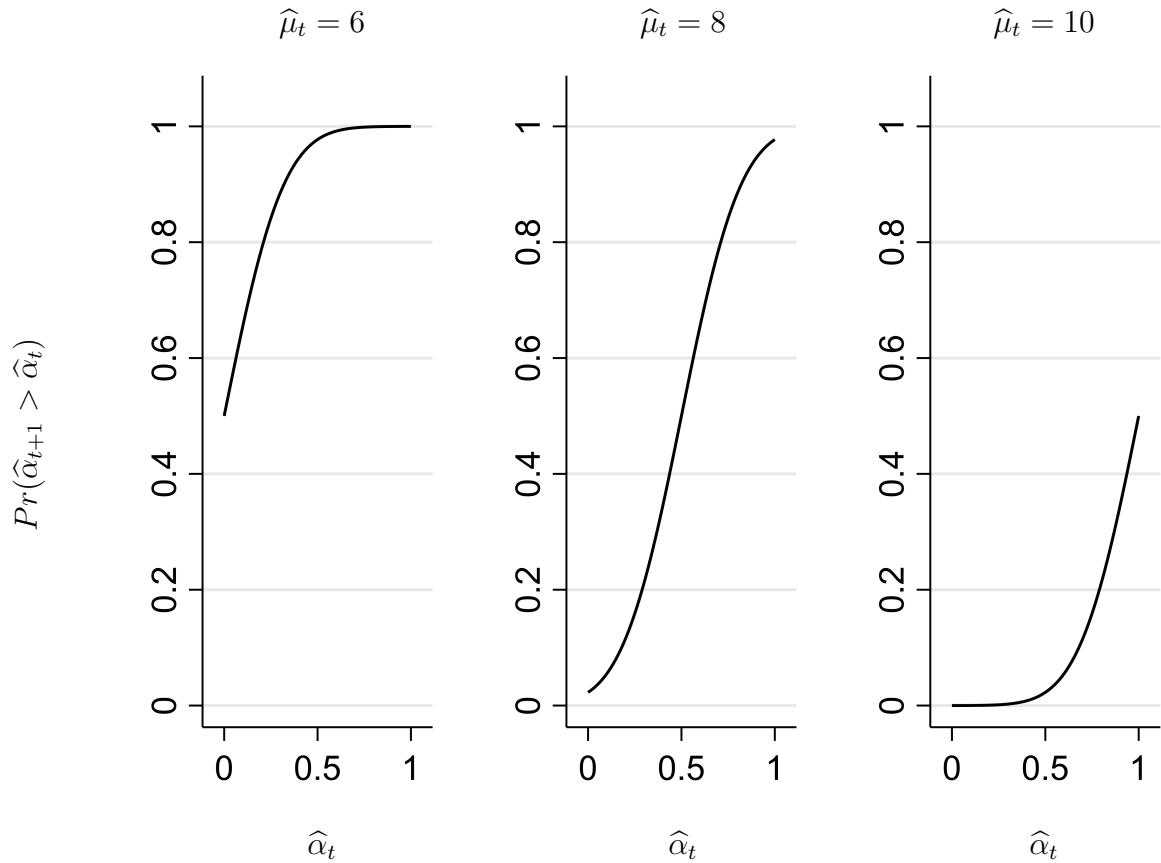


Figure 4: Qualitative Evidence of Hidden Income

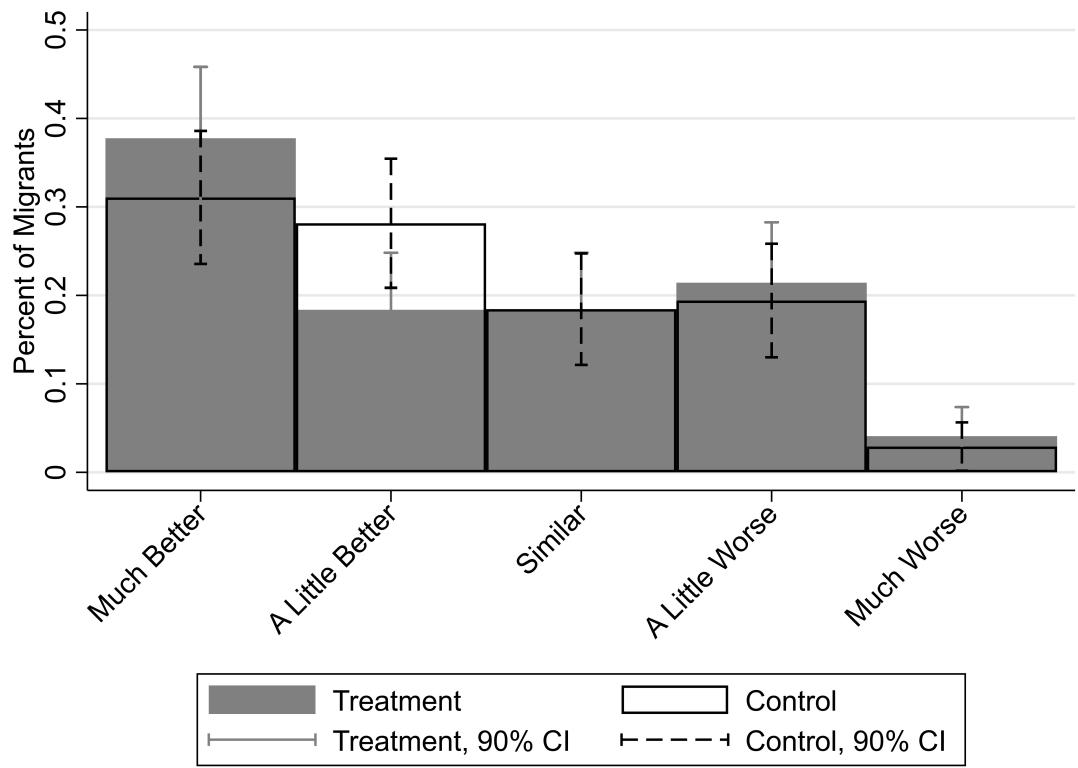


5.2 Appendix Figures – Replication Versions

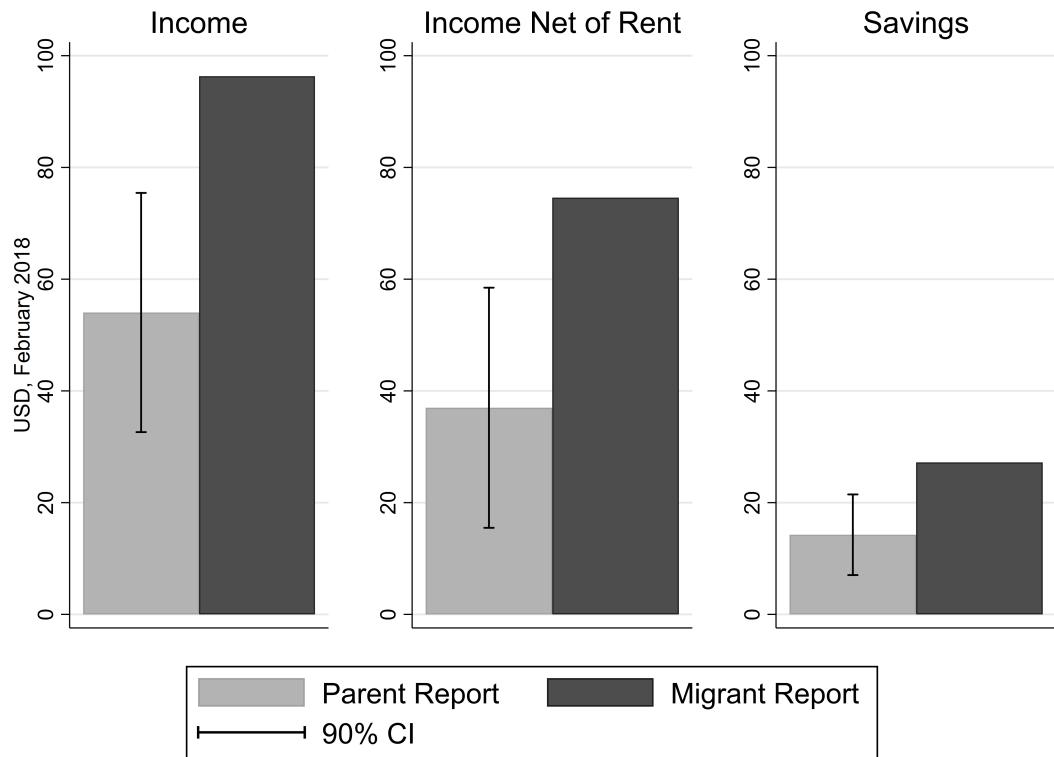
Appendix Figure C 1: Phase Diagrams of Beliefs About the Migrant's Type



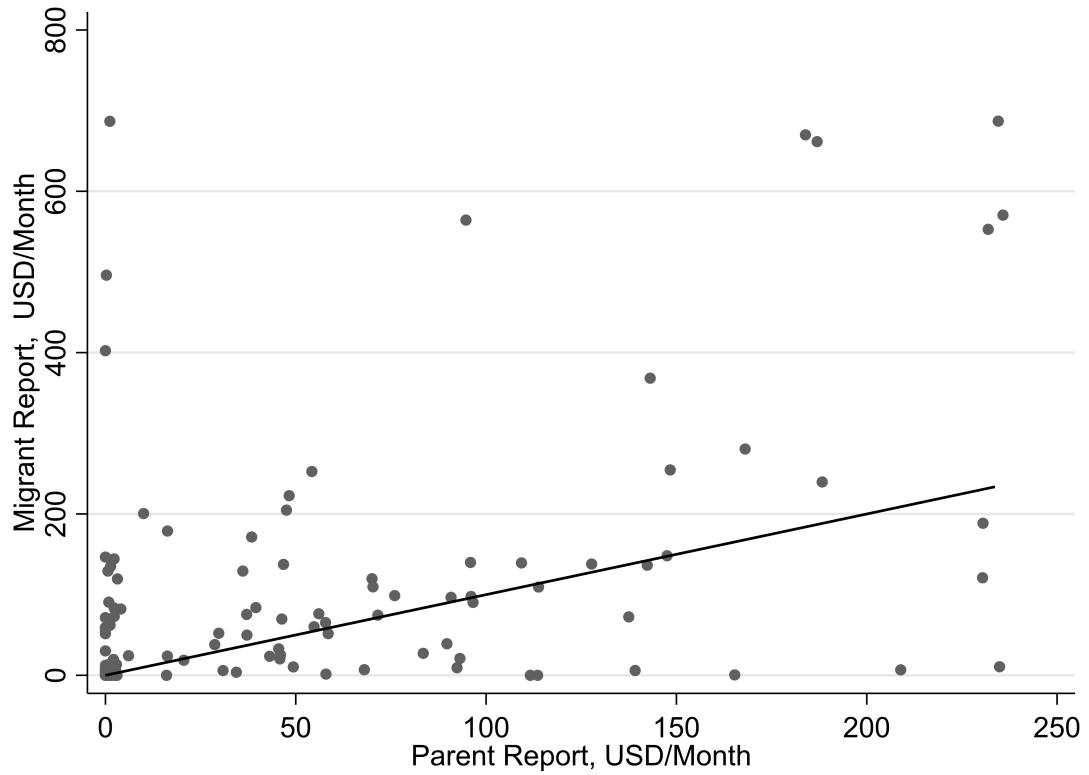
Appendix Figure D 1: Migrant Quality of Life in the Destination



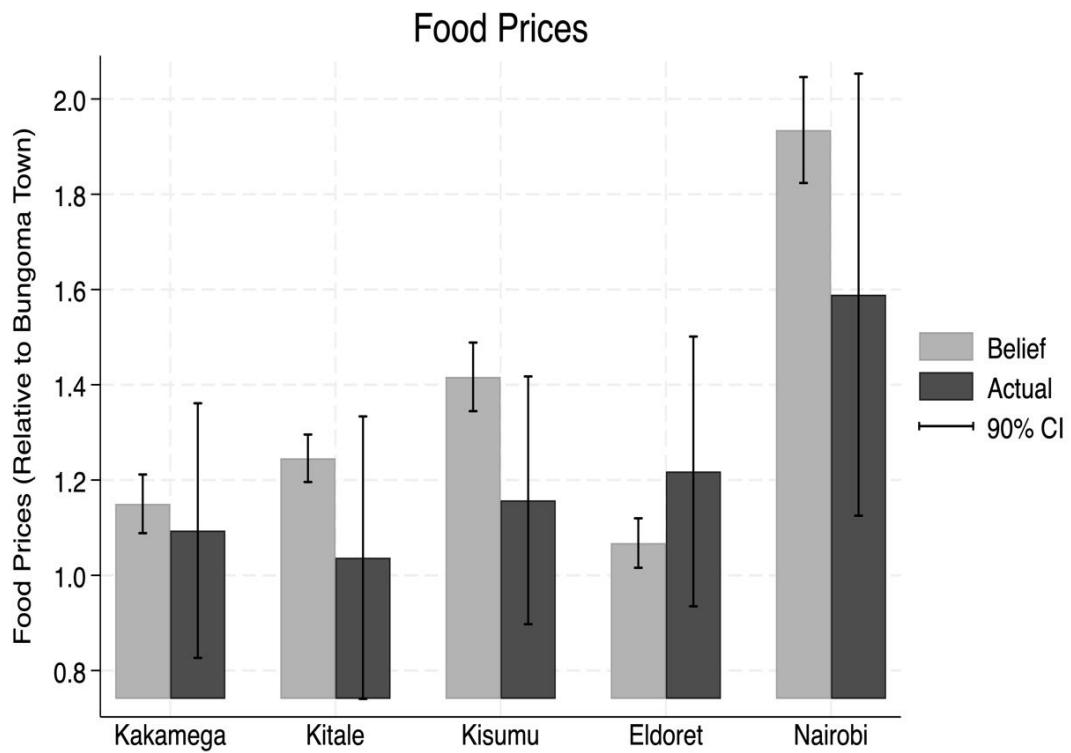
Appendix Figure E 1: Migrants' Parents Underestimate Their Incomes Net of Rent, and Savings



Appendix Figure E 2: Scatter-Plot of Migrant and Parent Reports of Migrants' Earnings



Appendix Figure E 3: Perceived and True Food Prices Across Kenya



6 Replicated Tables

6.1 Paper Tables – Replication Versions

Table 1: ULM Information Changes Beliefs About Nairobi.

	(1) Would Migrate to (City)	(2) Potential Own Income in (City)	(3) Would Work in Treated Job in (City)
Nairobi			
Received Urban Info = 1	0.091 (0.044) [0.04]	24.8 (12.7) [0.05]	0.11 (0.045) [0.02]
Dep. Var. Mean in Control	0.54	125.5	0.45
Number of Observations	497	494	497
Kisumu			
Received Urban Info = 1	-0.020 (0.016) [0.22]	0.79 (10.4) [0.94]	0.072 (0.043) [0.09]
Dep. Var. Mean in Control	0.044	113.0	0.34
Number of Observations	497	494	497
Eldoret			
Received Urban Info = 1	0.047 (0.034) [0.17]	0.61 (9.87) [0.95]	0.14 (0.039) [0.00]
Dep. Var. Mean in Control	0.16	113.3	0.20
Number of Observations	497	494	497

Each observation is a household. Income units are USD/month per worker. *Would work in treated job* is a dummy = 1 when the household reports that their migrant would find one of jobs mentioned in the treatment. Results are estimated through post-double LASSO regression (Belloni et al. 2014). Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect in brackets.

Table 2: ULM Information Increases Migration to Nairobi

	Cumulative Effect				Status in Reference Month			
	1 Year		2 Years		1 Year		2 Years	
	ITT	Ctrl. Mean						
Overall Outcomes								
# Moving Outside County	0.04 (0.08) [0.66]	0.81	0.11 (0.10) [0.26]	1.25	0.08 (0.06) [0.21]	0.46	0.09 (0.07) [0.19]	0.49
# Employed Anywhere	0.12 (0.12) [0.30]	2.07	0.10 (0.14) [0.44]	2.84	0.12 (0.12) [0.30]	1.74	0.05 (0.13) [0.69]	1.96
# Employed in Non-Agriculture	0.18 (0.10) [0.06]	1.19	0.20 (0.11) [0.08]	1.77	0.23 (0.09) [0.01]	0.93	0.09 (0.11) [0.43]	1.46
Specific Destination Outcomes								
# Moving to Nairobi	0.14 (0.05) [0.01]	0.22	0.18 (0.07) [0.01]	0.48	0.07 (0.03) [0.03]	0.10	0.08 (0.04) [0.07]	0.17
# Moving to Kisumu	-0.01 (0.02) [0.56]	0.07	-0.03 (0.04) [0.47]	0.16	-0.01 (0.01) [0.36]	0.03	-0.00 (0.01) [0.74]	0.03
# Moving to Eldoret	-0.02 (0.03) [0.39]	0.10	-0.05 (0.04) [0.23]	0.25	-0.02 (0.02) [0.13]	0.05	0.00 (0.01) [0.76]	0.02
# Employed in Nairobi	0.07 (0.03) [0.02]	0.08	0.18 (0.05) [0.00]	0.22	0.05 (0.02) [0.04]	0.05	0.13 (0.04) [0.00]	0.13
# Employed in Kisumu	0.01 (0.01) [0.55]	0.02	0.02 (0.02) [0.35]	0.03	0.00 (0.01) [1.00]	0.01	-0.00 (0.01) [0.98]	0.01
# Employed in Eldoret	-0.01 (0.01) [0.36]	0.03	-0.00 (0.02) [0.97]	0.05	-0.01 (0.01) [0.25]	0.02	0.00 (.) [.]	0.00
Number of Observations	485		454		485		454	

An observation is a family (origin household + migrants). An outcome is the number of family members who migrated or found employment. Each cell shows a regression of an outcome on an indicator for assignment to the ULM information treatment group. Migration and employment outcomes for specific destinations refer to new migration after the ULM treatment in January 2017. *Cumulative effect* refers to the time interval from the information treatment to the 1 or 2-year follow-up survey (e.g., treated families sent 0.14 more migrants to Nairobi over the year following information provision). *Status in reference month* refers to migration or employment status in the months of February 2018 or March 2019 for the 1 and 2-year follow-ups respectively (e.g., treated families had 0.07 more new migrants living in Nairobi as of February 2018). Results are estimated through post-double LASSO regression (Belloni et al. 2014). Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect in brackets.

Table 3: ULM Information Increases Total Reported Income and Financial Well-Being.

	ITT	Control Mean	N
Total Income	32.7 (10.4) [0.00]	140.0	939
Income Earned in Nairobi	31.9 (16.16) [0.05]	20.5	939
Remittances to Origin Household	2.57 (1.99) [0.20]	10.0	896
Savings	2.60 (2.01) [0.20]	12.4	896
Food Expenditure	3.27 (1.71) [0.06]	35.8	896
Reports Healthy Finances = 1	0.078 (0.03) [0.02]	0.55	896
Mental Health (MHI-5) Index at Origin	0.24 (0.10) [0.01]	0	435

Currency units are USD/month. An observation is a family (origin household + migrants) in a post-treatment year. Income and remittances are measured at the individual level and aggregated up to the family level. Savings and food expenditure are measured for the total origin household and added to migrant values. *Reports healthy finances* is a dummy = 1 if the origin household head reports not being concerned about the household's financial situation. *Mental health index* is a standardized measure of mental health of the origin household head and is only measured in the 2019 follow-up survey. Data collected from household surveys and phone surveys of individual household members. Income and migration data collected from neighbors at the origin for 43 households which could not be located during follow-up. ITT results estimated from a regression of an outcome on an indicator for assignment to the ULM information treatment group, the pre-treatment value of the outcome, and a time fixed effect. Results are estimated through post-double LASSO regression (Belloni et al. 2014). Standard errors in parentheses are clustered at the family level; two-sided p-values testing a zero treatment effect are in brackets.

Table 4: Strategic Misreporting Incentives Predict Low Beliefs About Migrant Income.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Perceived Migrant Income							
True income	0.19 (0.037) [0.00]	0.19 (0.038) [0.00]	0.17 (0.043) [0.00]	0.19 (0.038) [0.00]	0.17 (0.044) [0.00]	0.16 (0.045) [0.00]	0.25 (0.13) [0.06]	0.25 (0.13) [0.05]
Parents' Expected Remittance Share	-47.3 (22.2) [0.03]				-54.5 (21.4) [0.01]	-56.2 (21.3) [0.01]	-11.5 (12.8) [0.37]	-11.5 (12.7) [0.36]
Migrant Can't Share Remit Burden = 1			-33.3 (15.2) [0.03]		-33.0 (13.4) [0.01]		-28.6 (15.5) [0.07]	
Villager Socially Close to Migrant's Parents = 1				-20.6 (19.5) [0.29]	-17.6 (16.4) [0.29]		-16.1 (16.2) [0.32]	
Type of Worker Controls?	Migrants N	Migrants Y	Locals N	Locals Y				
Dep. Var. Mean	50.0	50.0	50.0	50.0	50.0	50.0	15.6	15.6
Number of Workers	242	242	181	242	181	181	155	155
Number of Villagers	350	350	323	350	323	323	116	116
Number of Observations	571	571	510	571	510	510	155	155

Each observation is a worker-villager pair (villagers include parents, neighbors, and friends who reside in the origin village). Income units are USD/month. Columns (1)–(6) use a sample of migrant workers; Columns (7)–(8) use a sample of local workers residing in the village. *Perceived income* is the worker's income as reported by the villager; *True income* is the worker's income as reported by the worker. Results in Columns (6) and (8) are estimated by post-double-LASSO regression (Belloni et al. 2014) with a high-dimensional set of worker, villager, and worker \times villager-level controls. Standard errors are two-way cluster-robust (?) at the worker and villager level; two-sided p-values are in brackets.

Table 5: MR Treatment Effects on Beliefs About the Returns to Migration

Beliefs About:	(1) Potential Own Income in Nairobi	(2) Standardized Migrant Income in Nairobi	(3) Potential Own Income in Nairobi	(4) Standardized Migrant Income in Nairobi
Panel A: Descriptive Correlations				
Ever Traveled to Nairobi = 1	24.0 (2.8)	9.1 (1.9)		
Ever Sought Work in Nairobi = 1	17.0 (3.6)	10.0 (2.4)		
Ever Worked in Nairobi = 1	19.0 (3.5)	10.3 (2.3)		
Adult Child in Nairobi = 1	0.4 (3.1)	0.3 (2.0)		
Number of Observations	6,534	6,633	6,534	6,633
Panel B: Treatment Effects				
Remittance Treatment = 1	2.8 (4.9) [0.56]	-1.4 (3.3) [0.67]	14.2 (6.2) [0.02]	3.8 (4.2) [0.36]
Ever Traveled to Nairobi = 1			45.5 (8.2) [0.00]	21.3 (5.6) [0.00]
Remittance Treatment *			-21.3 (9.4) [0.02]	-9.8 (6.4) [0.13]
Ever Traveled to Nairobi = 1				
Placebo Treatment = 1	4.2 (5.4) [0.43]	-0.9 (3.6) [0.80]	14.8 (6.9) [0.03]	2.6 (4.6) [0.57]
Placebo Treatment *			-19.8 (10.0) [0.05]	-6.4 (6.9) [0.36]
Ever Traveled to Nairobi = 1				
Dep. Var. Mean in Control	135	115	135	115
Number of Observations	4,414	4,465	4,414	4,465

Each observation is a household. Each cell in Panel A is a regression; each column in Panel B is a regression. All outcome variables are USD/month per worker. *Potential own income in Nairobi* is the income the respondent thinks someone from their household could earn if they migrated to Nairobi. *Standardized migrant income in Nairobi* is the earnings the respondent thinks a young man from their village could earn in Nairobi after graduating from secondary school. Households with adult children living in Nairobi are excluded from the experimental sample and so do not appear in Panel B. All regressions in Panel B include strata and enumerator fixed effects. The response *Don't Know* is coded as missing. Robust standard errors in parenthesis. Two-sided p-values in brackets in Panel B.

Appendix Tables – Reproduced Results

Appendix Table A 1: Comparison of Experimental Sample to County Population

	Sample	Census	Difference (S-C)	P-Value
Male Head: Age	42.9 (13.3)	39.2 (13.8)	3.7 (0.7)	0.00
Male Head: Education (Years)	9.00 (3.15)	7.97 (3.43)	1.0 (0.2)	0.00
No Male Head	0.27 (0.44)	0.27 (0.45)	-0.0 (0.02)	0.64
Female Head: Age	37.4 (12.1)	35.4 (13.7)	2.0 (0.6)	0.00
Female Head: Education (Years)	8.02 (3.06)	6.95 (3.41)	1.1 (0.1)	0.00
No Female Head	0.046 (0.21)	0.075 (0.26)	-0.0 (0.010)	0.00
# Adults in Household	2.58 (1.07)	2.43 (1.21)	0.1 (0.05)	0.00
# Adults Aged 18–35 in Household	1.80 (0.89)	1.69 (0.84)	0.1 (0.04)	0.00
Number of Observations	497	15,237	15,734	

First two columns show means (standard deviations) within sample villages and the 2009 national 10% census, respectively. Third column shows differences in means (standard errors) and the fourth column shows the p-value from a two-sided t-test of equivalence of means. Census data includes all households with at least 1 member aged 18–35 in Bungoma County (where 81% of sampled households reside). Education top-coded at 13 years and age top-coded at 79 years to match census coding.

Appendix Table A 2: ULM Experiment Randomization Balance (N=497 Families)

	Control (N=249)	Treatment (N=248)	Difference (C-T)	P-Value
Demographics				
Male Head: Age	42.2 (12.1)	43.4 (13.5)	-1.2 (1.2)	0.31
Male Head: Education (Years)	9.22 (2.79)	9.03 (3.16)	0.2 (0.3)	0.48
No Male Head	0.15 (0.36)	0.097 (0.30)	0.1 (0.03)	0.06
Female Head: Age	37.1 (11.8)	37.6 (12.2)	-0.5 (1.1)	0.62
Female Head: Education (Years)	7.95 (3.00)	8.16 (3.01)	-0.2 (0.3)	0.44
No Female Head	0.036 (0.19)	0.040 (0.20)	-0.0 (0.02)	0.81
/ Adults in Family	3.84 (2.30)	4.01 (2.37)	-0.2 (0.2)	0.41
Monthly Earnings				
Male Head: Any Non-Farm Employment	0.56 (0.50)	0.60 (0.49)	-0.0 (0.04)	0.44
Male Head: Earnings Last Month	44.8 (88.3)	50.2 (112.9)	-5.5 (9.1)	0.55
Female Head: Any Non-Farm Employment	0.36 (0.48)	0.36 (0.48)	-0.0 (0.04)	0.97
Female Head: Earnings Last Month	13.3 (40.2)	13.8 (30.4)	-0.5 (3.2)	0.88
Saved Any Money Last Month	0.40 (0.49)	0.41 (0.49)	-0.0 (0.04)	0.76
Amount Saved Last Month	16.0 (41.2)	22.2 (98.6)	-6.1 (6.8)	0.37
Migration				
Ever Migrated to Big City	0.63 (0.48)	0.68 (0.47)	-0.0 (0.04)	0.27
Ever Migrated to Nairobi	0.41 (0.49)	0.45 (0.50)	-0.0 (0.04)	0.39
Ever Migrated to Kisumu	0.076 (0.27)	0.097 (0.30)	-0.0 (0.03)	0.42
Ever Migrated to Eldoret	0.19 (0.39)	0.14 (0.35)	0.0 (0.03)	0.15
Has Migrant in Big City	0.43 (0.50)	0.41 (0.49)	0.0 (0.04)	0.68
Has Migrant in Nairobi	0.20 (0.40)	0.17 (0.38)	0.0 (0.04)	0.43
Has Migrant in Kisumu	0.024 (0.15)	0.032 (0.18)	-0.0 (0.01)	0.58
Has Migrant in Eldoret	0.076 (0.27)	0.028 (0.17)	0.0 (0.02)	0.02

First two columns show means (standard deviations) within control and treatment groups, respectively. Third column shows differences (standard errors) between treatment and control means, and the fourth column shows the p-value from a two-sided t-test of equivalence of means. Income units are USD/month.

Appendix Table A 3: Selection Into Migration at Baseline (N=2,557 Individuals)

	Non-Migrant (N=1,934)	Migrant (N=623)	Difference (N-M)	P-Value
Individual Characteristics				
Age (Years)	27.3 (14.1)	30.2 (11.1)	-3.0 (0.6)	0.00
Male = 1	0.44 (0.50)	0.52 (0.50)	-0.1 (0.02)	0.00
Single = 1	0.52 (0.50)	0.34 (0.47)	0.2 (0.02)	0.00
Education (Years)	8.46 (2.92)	10.0 (2.76)	-1.5 (0.1)	0.00
Earned Money Last Month	0.25 (0.44)	0.47 (0.50)	-0.2 (0.02)	0.00
Earnings, Last Month	14.5 (40.0)	39.1 (62.6)	-24.6 (2.7)	0.00
Household Characteristics				
Male Head: Age	47.0 (13.2)	46.8 (14.2)	0.2 (0.6)	0.76
Male Head: Education (Years)	8.84 (3.19)	9.25 (3.18)	-0.4 (0.1)	0.01
Female Head: Age	41.5 (12.0)	42.2 (13.0)	-0.7 (0.6)	0.21
Female Head: Education (Years)	7.74 (3.06)	7.55 (3.47)	0.2 (0.2)	0.22
/ Adults in Family	4.90 (2.68)	5.30 (2.83)	-0.4 (0.1)	0.00
Male Head: Any Non-Farm Employment	0.52 (0.50)	0.51 (0.50)	0.0 (0.02)	0.76
Male Head: Earnings Last Month	47.8 (114.9)	47.6 (111.2)	0.1 (5.2)	0.98
Female Head: Any Non-Farm Employment	0.35 (0.48)	0.31 (0.46)	0.0 (0.02)	0.07
Female Head: Earnings Last Month	13.1 (36.6)	11.3 (28.1)	1.8 (1.4)	0.20
Saved Any Money Last Month	0.36 (0.48)	0.36 (0.48)	-0.0 (0.02)	0.84
Amount Saved Last Month	18.2 (63.8)	17.7 (69.7)	0.5 (3.2)	0.87

First two columns show means (standard deviations) for those who have never migrated to a big city and those who have, respectively. Third column shows mean differences (standard errors) between migrants and non-migrants, and the fourth column shows the p-value from a two-sided t-test of equivalence of means. *Big City* includes Nairobi, Kisumu, Eldoret, Bungoma, Kakamega, Busia, Kitale, Nakuru, and Mombasa. Income units are USD/month.

Appendix Table A 4: Migration Patterns in ULM Experimental Sample From 2017–2019

	Location in January 2017			
	Home village	Nairobi	Other Big City	Other
% Migrating Over the Following Year to:				
Nairobi	0.06	0.72	0.13	0.08
Other Big City	0.07	0.06	0.59	0.08
Town	0.07	0.05	0.06	0.19
Village	0.05	0.06	0.09	0.15
% Migrating Over the Following Two Years to:				
Nairobi	0.11	0.81	0.21	0.13
Other Big City	0.10	0.15	0.69	0.12
Town	0.11	0.12	0.10	0.26
Village	0.09	0.11	0.17	0.31
Number of Observations	1,403	115	90	321

Each observation is an individual aged 18–70 as of 2017. *Migrating over the following year* includes either living in the destination as of 3/2018, or living there temporarily at some point between 1/2017 and 3/2018. For example, 5% of individuals residing in their home village as of 1/2017 migrated to Nairobi at some point that same year, and 68% of individuals residing in Nairobi as of 1/2017 were either living in Nairobi as of 3/2018, or left Nairobi after 1/2017, returned temporarily, and were outside Nairobi as of 3/2018. *Migrating over the following two years* includes either living in the destination as of 4/2019, or living there temporarily at some point between 1/2017 and 4/2019. *Other big city* includes 5 large cities in Kenya other than Nairobi: Kisumu, Eldoret, Mombasa, Nakuru, and Kitale. Column sums can exceed 100% of a person migrates to several destinations.

Appendix Table A 5: Characteristics of Attritors at 1-Year Follow-Up

	Surveyed (N=485)	Attrited (N=12)	Difference (S-A)	P-Value
Demographics				
Male Head: Age	42.9 (12.8)	36.1 (13.4)	6.8 (3.9)	0.11
Male Head: Education (Years)	9.13 (2.99)	8.93 (2.39)	0.2 (0.7)	0.79
No Male Head	0.12 (0.33)	0.17 (0.39)	-0.04 (0.1)	0.71
Female Head: Age	37.4 (12.0)	34.8 (12.2)	2.6 (3.6)	0.48
Female Head: Education (Years)	8.05 (3.03)	8.09 (2.02)	-0.04 (0.6)	0.95
No Female Head	0.037 (0.19)	0.083 (0.29)	-0.05 (0.08)	0.59
/ Adults in Family	3.94 (2.35)	3.25 (1.66)	0.7 (0.5)	0.19
Monthly Earnings				
Male Head: Any Non-Farm Employment	0.58 (0.49)	0.58 (0.51)	-0.004 (0.2)	0.98
Male Head: Earnings Last Month	47.9 (102.3)	33.1 (37.5)	14.8 (11.8)	0.23
Female Head: Any Non-Farm Employment	0.36 (0.48)	0.25 (0.45)	0.1 (0.1)	0.40
Female Head: Earnings Last Month	13.6 (35.9)	11.1 (23.5)	2.5 (7.0)	0.72
Saved Any Money Last Month	0.40 (0.49)	0.50 (0.52)	-0.10 (0.2)	0.53
Amount Saved Last Month	19.0 (76.0)	22.5 (53.5)	-3.5 (15.8)	0.83
Migration				
Ever Migrated to Big City	0.66 (0.47)	0.50 (0.52)	0.2 (0.2)	0.32
Ever Migrated to Nairobi	0.43 (0.50)	0.25 (0.45)	0.2 (0.1)	0.19
Ever Migrated to Kisumu	0.085 (0.28)	0.17 (0.39)	-0.08 (0.1)	0.48
Ever Migrated to Eldoret	0.17 (0.38)	0 (0)	0.2 (0.02)	0.00
Has Migrant in Big City	0.42 (0.49)	0.33 (0.49)	0.09 (0.1)	0.57
Has Migrant in Nairobi	0.19 (0.39)	0.083 (0.29)	0.1 (0.09)	0.24
Has Migrant in Kisumu	0.029 (0.17)	0 (0)	0.03 (0.008)	0.00
Has Migrant in Eldoret	0.054 (0.23)	0 (0)	0.05 (0.01)	0.00
Treatment Status				
Received Urban Info = 1	0.50 (0.50)	0.50 (0.52)	-0.001 (0.2)	0.99

First two columns show means (standard deviations) for those surveyed (directly or by proxy) at the 1-year follow-up and attritors, respectively, out of the 497 households in the ULM experimental sample. Third column shows mean differences (standard errors) between non-attritors and attritors, and the fourth column shows the p-value from a two-sided t-test of equivalence of means. *Big City* includes Nairobi, Kisumu, Eldoret, Bungoma, Kakamega, Busia, Kitale, Nakuru, and Mombasa. Income units are USD/month.

Appendix Table A 6: Characteristics of Attritors at 2-Year Follow-Up

	Surveyed (N=454)	Attrited (N=43)	Difference (S-A)	P-Value
Demographics				
Male Head: Age	43.0 (12.8)	40.2 (12.8)	2.8 (2.0)	0.18
Male Head: Education (Years)	9.11 (2.99)	9.25 (2.83)	-0.1 (0.5)	0.76
No Male Head	0.12 (0.33)	0.16 (0.37)	-0.04 (0.06)	0.48
Female Head: Age	37.5 (12.0)	35.8 (12.2)	1.6 (1.9)	0.40
Female Head: Education (Years)	8.04 (3.03)	8.12 (2.74)	-0.08 (0.4)	0.86
No Female Head	0.035 (0.18)	0.070 (0.26)	-0.03 (0.04)	0.40
/ Adults in Family	3.95 (2.33)	3.60 (2.42)	0.3 (0.4)	0.37
Monthly Earnings				
Male Head: Any Non-Farm Employment	0.59 (0.49)	0.51 (0.51)	0.07 (0.08)	0.36
Male Head: Earnings Last Month	48.9 (104.3)	33.3 (59.7)	15.6 (10.3)	0.14
Female Head: Any Non-Farm Employment	0.36 (0.48)	0.37 (0.49)	-0.01 (0.08)	0.89
Female Head: Earnings Last Month	13.0 (34.0)	19.7 (49.6)	-6.8 (7.7)	0.39
Saved Any Money Last Month	0.40 (0.49)	0.42 (0.50)	-0.02 (0.08)	0.85
Amount Saved Last Month	16.8 (44.0)	43.8 (214.1)	-27.1 (32.7)	0.41
Migration				
Ever Migrated to Big City	0.66 (0.47)	0.58 (0.50)	0.08 (0.08)	0.32
Ever Migrated to Nairobi	0.44 (0.50)	0.30 (0.46)	0.1 (0.07)	0.07
Ever Migrated to Kisumu	0.084 (0.28)	0.12 (0.32)	-0.03 (0.05)	0.53
Ever Migrated to Eldoret	0.17 (0.37)	0.16 (0.37)	0.002 (0.06)	0.97
Has Migrant in Big City	0.42 (0.49)	0.35 (0.48)	0.07 (0.08)	0.34
Has Migrant in Nairobi	0.19 (0.39)	0.14 (0.35)	0.05 (0.06)	0.36
Has Migrant in Kisumu	0.026 (0.16)	0.047 (0.21)	-0.02 (0.03)	0.55
Has Migrant in Eldoret	0.048 (0.21)	0.093 (0.29)	-0.04 (0.05)	0.34
Treatment Status				
Received Urban Info = 1	0.50 (0.50)	0.44 (0.50)	0.06 (0.08)	0.44

First two columns show means (standard deviations) for those surveyed (directly or by proxy) at the 2-year follow-up and attritors, respectively, out of the 497 households in the ULM experimental sample. Third column shows mean differences (standard errors) between non-attritors and attritors, and the fourth column shows the p-value from a two-sided t-test of equivalence of means. *Big City* includes Nairobi, Kisumu, Eldoret, Bungoma, Kakamega, Busia, Kitale, Nakuru, and Mombasa. Income units are USD/month.

Appendix Table A 7: Characteristics of Attritors at 1-Year Phone Follow-Up

	Surveyed (N=309)	Not Surveyed (N=225)	Difference (S-N)	P-Value
Ever Migrated to Big City	0.41 (0.49)	0.34 (0.47)	0.07 (0.04)	0.10
Ever Migrated to Nairobi	0.16 (0.37)	0.15 (0.35)	0.01 (0.03)	0.71
Age (Years)	24.6 (4.93)	23.4 (4.68)	1.2 (0.4)	0.01
Male = 1	0.49 (0.50)	0.47 (0.50)	0.03 (0.04)	0.57
Single = 1	0.59 (0.49)	0.64 (0.48)	-0.05 (0.04)	0.24
Education (Years)	10.7 (2.18)	10.5 (2.44)	0.2 (0.2)	0.33
Earned Money Last Month	0.36 (0.48)	0.32 (0.47)	0.04 (0.04)	0.29
Earnings, Last Month	31.4 (58.2)	21.2 (46.6)	10.3 (4.5)	0.02
Received Urban Info = 1	0.48 (0.50)	0.50 (0.50)	-0.02 (0.04)	0.67

All variables measured at baseline. First two columns show means (standard deviations) for those surveyed by phone at the 1-year follow-up and those who were sampled but could not be reached, respectively, out of the 460 households in the ULM experimental sample that were surveyed at the 1-year follow-up. Third column shows mean differences (standard errors) between surveyed and non-surveyed individuals, and the fourth column shows the p-value from a two-sided t-test of equivalence of means. *Big City* includes Nairobi, Kisumu, Eldoret, Bungoma, Kakamega, Busia, Kitale, Nakuru, and Mombasa. Income units are USD/month.

Appendix Table A 8: Characteristics of Attritors at 2-Year Phone Follow-Up

	Surveyed (N=192)	Not Surveyed (N=100)	Difference (S-N)	P-Value
Ever Migrated to Big City	0.52 (0.50)	0.39 (0.49)	0.1 (0.06)	0.04
Ever Migrated to Nairobi	0.23 (0.42)	0.17 (0.38)	0.06 (0.05)	0.19
Age (Years)	24.4 (4.79)	23.7 (4.63)	0.6 (0.6)	0.26
Male = 1	0.47 (0.50)	0.41 (0.49)	0.06 (0.06)	0.30
Single = 1	0.63 (0.48)	0.61 (0.49)	0.02 (0.06)	0.74
Education (Years)	10.8 (2.26)	10.5 (2.65)	0.2 (0.3)	0.50
Earned Money Last Month	0.36 (0.48)	0.37 (0.49)	-0.01 (0.06)	0.86
Earnings, Last Month	32.6 (59.1)	28.7 (53.8)	3.9 (6.9)	0.57
Received Urban Info = 1	0.49 (0.50)	0.51 (0.50)	-0.02 (0.06)	0.81

All variables measured at baseline. First two columns show means (standard deviations) for those surveyed by phone at the 2-year follow-up and those who were sampled but could not be reached, respectively, out of the 460 households in the ULM experimental sample that were surveyed at the 1-year follow-up. Third column shows mean differences (standard errors) between surveyed and non-surveyed individuals, and the fourth column shows the p-value from a two-sided t-test of equivalence of means. *Big City* includes Nairobi, Kisumu, Eldoret, Bungoma, Kakamega, Busia, Kitale, Nakuru, and Mombasa. Income units are USD/month.

Appendix Table A 9: Summary of Attrition in the ULM Experiment

	Control	Treatment	Difference (C-T)	P-Value
1-Year Follow-Up				
Direct Household Survey	0.08	0.07	0.01	0.62
Direct or Indirect Household Survey	0.02	0.02	-0.00	0.99
Phone Survey	0.41	0.43	-0.02	0.64
2-Year Follow-Up				
Direct Household Survey	0.12	0.12	0.00	0.90
Direct or Indirect Household Survey	0.10	0.08	0.02	0.43
Phone Survey	0.34	0.35	-0.01	0.83

Each cell shows an attrition rate. Attrition rate is the number of completed surveys divided by the number of sampled units. Direct household surveys were attempted in person for all 497 households in the ULM experimental sample. Indirect household surveys were completed in person when the household could not be reached, and included only a subset of outcomes such as migration status and earnings (but not remittances, savings, expenditure, or subjective well-being). Phone surveys were attempted for individuals with phone numbers aged 18–35 who are not household heads at the 1-year follow-up, and individuals with phone numbers aged 18–35 who are not household heads and were currently urban migrants at the 2-year follow-up. P-values computed from a two-sided t-test of equivalence of means.

Appendix Table A 10: Correlates of Hidden Income Predictors

	Expected Remittance Share	Migrant Can't Share Remit Burden = 1	Villager Socially Close to Migrant's Family = 1
Villager Characteristics			
Lives at Migrant's Origin Household = 1			0.123
Education (Years)			0.004
Age (Years)			
Female = 1			
Married = 1			
Has Migrated to Big City = 1			
Has Migrated to Nairobi = 1			
Employed = 1			
Earnings Last Month (USD)			
Migrant's Remittances to Origin Household (USD/month)		-0.017	
Migrant Characteristics			
Education (Years)			
Age (Years)			
Female = 1			
Married = 1			
Lives in Big City			
Lives in Medium City			
Years in Current City			
Commute Time Between Residence and Job (Minutes)			
Number of Job Changes in Past Year			
Employed = 1			
Uses Improved Toilet = 1			
Uses Improved Water Source = 1			
Uses Improved Fuel Source = 1			
Recent Experienced Safety Issue in City = 1			
Recently Injured = 1			
Recently Had Financial Emergency = 1			
Speaks with Origin Household Frequently = 1			
Number of Observations	510	510	510

Each observation is a migrant-villager pair (villagers include parents, neighbors, and friends who reside in the origin village). Currency units are USD/month. Each column shows estimates from a post-LASSO regression (?) of a hidden income predictor on a set of 40 controls (occupation fixed effects and treatment and survey-round dummies not shown). Lasso penalty loadings account for two-way clustering at the migrant and villager level.

Appendix Table D 1: ULM Treatment Effect Heterogeneity on Migration to Nairobi

	ITT Effect Over 1 Year			ITT Effect Over 2 Years		
	Below Mean	Above Mean	P-Value	Below Mean	Above Mean	P-Value
Demographics						
Male Head: Age	0.11 (0.07)	0.15 (0.08)	0.67	0.19 (0.08)	0.18 (0.1)	0.93
Male Head: Education (Years)	0.094 (0.07)	0.19 (0.08)	0.39	0.18 (0.1)	0.17 (0.1)	0.95
No Male Head	0.15 (0.05)	0.067 (0.2)	0.70	0.18 (0.08)	0.23 (0.3)	0.88
Female Head: Age	0.12 (0.06)	0.14 (0.09)	0.86	0.22 (0.08)	0.12 (0.1)	0.51
Female Head: Education (Years)	0.11 (0.07)	0.19 (0.08)	0.47	0.22 (0.10)	0.11 (0.1)	0.49
No Female Head	0.14 (0.05)	-0.10 (0.4)	0.56	0.20 (0.08)	-0.25 (0.6)	0.46
/ Adults in Family	0.12 (0.06)	0.13 (0.10)	0.93	0.22 (0.08)	0.085 (0.1)	0.37
Monthly Earnings						
Male Head: Any Non-Farm Employment	0.14 (0.10)	0.14 (0.06)	0.99	0.22 (0.1)	0.16 (0.09)	0.68
Male Head: Earnings Last Month	0.11 (0.06)	0.19 (0.1)	0.50	0.19 (0.09)	0.15 (0.2)	0.81
Female Head: Any Non-Farm Employment	0.12 (0.07)	0.15 (0.09)	0.81	0.16 (0.10)	0.22 (0.1)	0.70
Female Head: Earnings Last Month	0.13 (0.06)	0.16 (0.1)	0.78	0.13 (0.09)	0.34 (0.2)	0.25
Saved Any Money Last Month	0.17 (0.07)	0.086 (0.07)	0.43	0.19 (0.1)	0.17 (0.1)	0.90
Amount Saved Last Month	0.15 (0.06)	0.051 (0.1)	0.41	0.18 (0.09)	0.18 (0.2)	0.99
Migration						
Ever Migrated to Big City	0.049 (0.05)	0.16 (0.07)	0.22	0.15 (0.10)	0.17 (0.1)	0.88
Ever Migrated to Nairobi	0.10 (0.04)	0.15 (0.1)	0.64	0.16 (0.07)	0.17 (0.1)	0.96
Ever Migrated to Kisumu	0.11 (0.06)	0.39 (0.2)	0.15	0.17 (0.08)	0.29 (0.3)	0.64
Ever Migrated to Eldoret	0.12 (0.06)	0.21 (0.1)	0.58	0.21 (0.08)	0.076 (0.2)	0.57
Has Migrant in Big City	0.066 (0.05)	0.24 (0.10)	0.13	0.20 (0.08)	0.17 (0.1)	0.82
Has Migrant in Nairobi	0.13 (0.05)	0.25 (0.2)	0.49	0.19 (0.07)	0.25 (0.2)	0.79
Has Migrant in Kisumu	0.12 (0.05)	0.46 (0.3)	0.26	0.18 (0.08)	0.26 (0.5)	0.85
Has Migrant in Eldoret	0.15 (0.05)	-0.14 (0.3)	0.25	0.22 (0.08)	-0.40 (0.4)	0.11

Outcome is the number of migrants traveling to Nairobi over the 1 or 2 years following the ULM experiment. Treatment effects are estimated within subgroups using a regression of an outcome on a treatment dummy, a subgroup indicator dummy, and an interaction term. Subgroups are defined by a split around the mean value (for example, the treatment effect on the number of migrants traveling to Nairobi over 1 year for households with an above-average male head age is 0.15). P-values taken from a two-sided t-test of equivalence of means. Robust standard errors in parentheses. *Big City* includes Nairobi, Kisumu, Eldoret, Nakuru, Mombasa, Kitale, Kakamega, Bungoma, and Mumias.

Appendix Table D 2: ULM Information Treatment Effects on Migration to Other Destinations

	1 Year		2 Years	
	ITT	Ctrl. Mean	ITT	Ctrl. Mean
# moving to Bungoma Town	-0.00 (0.04) [0.93]	0.16	-0.02 (0.06) [0.70]	0.33
# Moving to Kakamega Town	-0.05 (0.03) [0.06]	0.09	-0.12 (0.04) [0.01]	0.23
# Moving to Busia Town	0.04 (0.03) [0.14]	0.03	-0.00 (0.04) [0.95]	0.13
# Moving to Kitale	0.02 (0.05) [0.67]	0.05	-0.07 (0.04) [0.07]	0.19
# Moving to Nakuru	0.00 (0.02) [0.99]	0.05	-0.04 (0.04) [0.30]	0.16
# Moving to Mombasa	0.02 (0.02) [0.29]	0.03	-0.02 (0.04) [0.52]	0.16
# Moving to Other City	-0.02 (0.07) [0.73]	0.52	0.01 (0.09) [0.89]	0.75
# Moving to Rural Destination	-0.00 (0.05) [0.94]	0.12	-0.07 (0.05) [0.18]	0.28
Number of Observations	485		454	

An observation is a family (origin household + migrants). An outcome is the number of family members who migrated from the information treatment to the 1 or 2-year follow-up survey. Each cell shows a regression of an outcome on an indicator for assignment to the ULM information treatment group. *Other city* excludes Nairobi, Kisumu, Eldoret, Bungoma, Kakamega, Busia, Kitale, Nakuru, and Mombasa. Results are estimated through post-double LASSO regression ([Belloni et al. 2014](#)). Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect in brackets.

Appendix Table D 3: ULM Treatment Effects on Perceived Encome for Existing Migrants

	(1) Reported Migrant Income, Feb 2018	(2) Reported Migrant Income, Feb 2018	(3) Reported Migrant Income, 2017	(4) Reported Migrant Income, 2017
Received Urban Info = 1	0.87 (12.4) [0.94]	0.87 (12.2) [0.94]	22.4 (137.8) [0.87]	22.4 (136.4) [0.87]
Dep. Var. Mean in Control	51.4	51.4	539.7	539.7
Demographic Controls?	N	Y	N	Y
Number of Observations	164	164	164	164

Each observation is a migrant who lived in a treated ULM city (Nairobi, Kisumu, or Eldoret) prior to the ULM experiment. Income units are USD/month as reported by household head. Income includes formal wages, casual labor, and business profits. Results in Columns (2) and (4) are estimated through post-double LASSO regression ([Belloni et al. 2014](#)) with individual-level pre-treatment controls. All regressions control for baseline income. Standard errors in parentheses are clustered at the family level; two-sided p-values testing a zero treatment effect are in brackets.

Appendix Table D 4: ULM Treatment Effects on Quality of Life (Household Head Reports)

	(1) Major Dispute b/t Head and Migrant in Past Year	(2) Individual Is Happy Most of the Time	(3) Individual Is Happy Most of the Time
Received Urban Info = 1	-0.006 (0.029) [0.83]	0.04 (0.033) [0.28]	-0.005 (0.051) [0.92]
Sample	Migrants	All	Migrants
Dep. Var. Mean in Control	0.11	0.58	0.63
Number of Observations	608	2,258	608

Each observation is an individual. Data are taken from surveys with household heads in April 2019. Columns (2) and (3) ask how often each individual in their family was happy during March 2019. Column (3) restricts the sample to individuals who are migrants as of March 2019. Results are estimated through post-double LASSO regression (Belloni et al. 2014). Standard errors in parentheses are clustered at the family level; two-sided p-values testing a zero treatment effect in brackets.

Appendix Table D 5: ULM Treatment Effects on Other Beliefs About Migration

	(1) Expected Time to Find a Job in Nairobi (Weeks)	(2) Estimated Cost of Trip to Nairobi	(3) Range of Expected Income in Nairobi	(4) Confidence (10-Point) in Potential Income in Nairobi
Received Urban Info = 1	-1.1 (0.94) [0.25]	5.9 (7.13) [0.41]	9.9 (13.3) [0.46]	-0.06 (0.28) [0.83]
Dep. Var. Mean in Control	9.10	99.3	115.4	6.48
Number of Observations	497	497	458	460

An observation is an origin household. Currency units are USD/month. ITT results estimated from a regression of an outcome on an indicator for assignment to the ULM information treatment group. Expected time to find a job and estimated cost of trip are measured during baseline surveys immediately after ULM information provision. Range of expected income and confidence in expected income are measured only during the 1-year follow up. *Don't Know* is coded as missing. Results are estimated through post-double LASSO regression (as in Belloni, Chernozhukov, and Hansen 2014). Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect are in brackets.

Appendix Table D 6: MR Treatment Effects (Pilot Sample)

	ITT	Control Mean	N
Beliefs About Nairobi			
Perceived Migrant Income	12.8 (11.6) [0.27]	177.0	339
Nairobi Migration Outcomes			
Plans to Migrate in 2018	0.073 (0.047) [0.12]	0.22	339
Number of Migrants in 2018	0.084 (0.048) [0.08]	0.15	317
Plans to Migrate in 2019	0.077 (0.053) [0.14]	0.28	311

Each observation is a family. Income units are USD/month per worker. *Perceived Migrant Income* is the respondent's belief about mean earnings for migrants living in Nairobi. *Potential Own Income* is how much a hypothetical migrant from their household could earn in Nairobi. The top four outcomes were measured in March 2018; the bottom two outcomes were measured in April 2019. Results are estimated through post-double LASSO regression (Belloni et al. 2014). Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect in brackets.

Appendix Table D 7: ULM Information Changes Beliefs About Nairobi (No Controls).

	(1) Would Migrate to (City)	(2) Potential Own Income in (City)	(3) Would Work in Treated Job in (City)
Nairobi			
Received Urban Info = 1	0.091 (0.044) [0.04]	22.4 (12.6) [0.08]	0.11 (0.045) [0.02]
Dep. Var. Mean in Control Number of Observations	0.54 497	125.5 494	0.45 497
Kisumu			
Received Urban Info = 1	-0.020 (0.016) [0.22]	0.79 (10.4) [0.94]	0.074 (0.043) [0.09]
Dep. Var. Mean in Control Number of Observations	0.044 497	113.0 494	0.34 497
Eldoret			
Received Urban Info = 1	0.041 (0.035) [0.24]	2.27 (10.2) [0.82]	0.14 (0.039) [0.00]
Dep. Var. Mean in Control Number of Observations	0.16 497	113.3 494	0.20 497

Each observation is a household. Income units are USD/month per worker. *Would work in treated job* is a dummy = 1 when the household reports that their migrant would find one of jobs mentioned in the treatment. Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect in brackets.

Appendix Table D 8: ULM Information Increases Migration to Nairobi (No Controls).

	Cumulative Effect				Status in Reference Month			
	1 Year		2 Years		1 Year		2 Years	
	ITT	Ctrl. Mean						
Overall Outcomes								
# Moving Outside County	0.04 (0.09) [0.67]	0.81	0.14 (0.12) [0.22]	1.25	0.07 (0.07) [0.29]	0.46	0.11 (0.08) [0.15]	0.49
# Employed Anywhere	0.16 (0.14) [0.23]	2.07	0.21 (0.17) [0.21]	2.84	0.16 (0.13) [0.20]	1.74	0.12 (0.14) [0.40]	1.96
# Employed in Non-Agriculture	0.22 (0.11) [0.05]	1.19	0.27 (0.14) [0.05]	1.77	0.25 (0.10) [0.01]	0.93	0.12 (0.12) [0.31]	1.46
Specific Destination Outcomes								
# Moving to Nairobi	0.13 (0.05) [0.01]	0.22	0.18 (0.08) [0.02]	0.48	0.08 (0.04) [0.03]	0.10	0.09 (0.05) [0.05]	0.17
# Moving to Kisumu	-0.01 (0.02) [0.57]	0.07	-0.03 (0.04) [0.44]	0.16	-0.01 (0.01) [0.36]	0.03	-0.00 (0.01) [0.74]	0.03
# Moving to Eldoret	-0.02 (0.03) [0.43]	0.10	-0.07 (0.05) [0.12]	0.25	-0.02 (0.02) [0.13]	0.05	0.00 (0.01) [0.76]	0.02
# Employed in Nairobi	0.07 (0.03) [0.02]	0.08	0.18 (0.05) [0.00]	0.22	0.05 (0.02) [0.03]	0.05	0.13 (0.04) [0.00]	0.13
# Employed in Kisumu	0.01 (0.01) [0.56]	0.02	0.02 (0.02) [0.36]	0.03	0.00 (0.01) [1.00]	0.01	-0.00 (0.01) [0.98]	0.01
# Employed in Eldoret	-0.01 (0.01) [0.36]	0.03	-0.00 (0.02) [0.97]	0.05	-0.01 (0.01) [0.26]	0.02	0.00 (.) [.]	0.00
Number of Observations	485		454		485		454	

An observation is a family (origin household + migrants). An outcome is the number of family members who migrated or found employment. Each cell shows a regression of an outcome on an indicator for assignment to the ULM information treatment group. Migration and employment outcomes for specific destinations refer to new migration after the ULM treatment in January 2017. *Cumulative effect* refers to the time interval from the information treatment to the 1 or 2-year follow-up survey (e.g., treated families sent 0.13 more migrants to Nairobi over the year following information provision). *Status in reference month* refers to migration or employment status in the months of February 2018 or March 2019 for the 1 and 2-year follow-ups respectively (e.g., treated families had 0.08 more new migrants living in Nairobi as of February 2018). Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect in brackets.

Appendix Table D 9: ULM Information Increases Total Reported Income and Financial Well-Being (No Controls).

	ITT	Control Mean	N
Total income	32.7 (10.4) [0.00]	140.0	939
Income Earned in Nairobi	31.9 (16.21) [0.05]	20.5	939
Remittances to Origin Household	2.62 (2.10) [0.21]	10.0	896
Savings	2.64 (2.03) [0.20]	12.4	896
Food Expenditure	3.27 (1.72) [0.06]	35.8	896
Reports Healthy Finances = 1	0.091 (0.03) [0.01]	0.55	896
Mental Health (MHI-5) Index at Origin	0.24 (0.10) [0.01]	0	435

Currency units are USD/month. An observation is a family (origin household + migrants) in a post-treatment year. Income and remittances are measured at the individual level and aggregated up to the family level. Savings and food expenditure are measured for the total origin household and added to migrant values. *Reports healthy finances* is a dummy = 1 if the origin household head reports not being concerned about the household's financial situation. *Mental health index* is a standardized measure of mental health of the origin household head and is only measured in the 2019 follow-up survey. Data collected from household surveys and phone surveys of individual household members. Income and migration data collected from neighbors at the origin for 43 households which could not be located during follow-up. ITT results estimated from a regression of an outcome on an indicator for assignment to the ULM information treatment group, the pre-treatment value of the outcome, and a time fixed effect. Standard errors in parentheses are clustered at the family level; two-sided p-values testing a zero treatment effect are in brackets.

Appendix Table E 1: Share of Households Under- and Overestimating Incomes, by City

	Share Underestimating	Share Overestimating	N
Kakamega Town	0.37	0.59	216
Kitale	0.50	0.16	215
Kisumu	0.44	0.16	215
Eldoret	0.70	0.06	218
Nairobi	0.59	0.06	215

See Figure 1 for information on sample. *Share underestimating* is the share of households who believe that the income gap between each city and Bungoma Town is less than half of the true gap (for example, 50% of households believe that Kitale incomes are 1.3 times as high as Bungoma Town incomes or less, when the true gap is 1.6). *Share overestimating* is the share of households who believe that the income gap between each city and Bungoma Town is more than double the true gap.

Appendix Table E 2: Perception Gaps for Urban Amenities

	Migrant Report	Origin Belief	P-Value	N
Positive Amenities				
Has Improved Toilet	0.57	0.42	0.01	91
Has Improved Main Water Source	0.85	0.91	0.22	102
Has Improved Main Fuel Source	0.73	0.48	0.00	104
Negative Amenities				
Neighborhood Safety Issue, Last Month	0.16	0.09	0.12	105
Was Sick or Injured, Last Month	0.24	0.26	0.73	109
Days Missed Work From Sickness/Injury	1.15	2.40	0.03	109

Data from surveys of migrants living in a city as of March 2018. First column shows the mean incidence of each urban amenity using data from migrant reports. Second column shows the mean belief about the incidence of each urban amenity using data from matched origin household surveys. Third column shows the p-value from a two-sided paired t-test of equivalence of means. Robust standard errors in parentheses. *Has improved toilet* is a dummy = 1 if the migrant has a flush toilet or VIP latrine. *Has improved water source* is a dummy = 1 if the migrant obtains most of their water from a pipe, borehole with pump, or protected spring/well. *Has improved main fuel source* is a dummy = 1 if the migrant's main household fuel source is gas/LPG, electricity, or paraffin. *Don't Knows* from origin respondents are coded as missing.

Tables – Unwinsorized Results

Unwinsorized Table F 2: ULM Information Increases Migration to Nairobi

	Cumulative Effect				Status in Reference Month			
	1 Year		2 Years		1 Year		2 Years	
	ITT	Ctrl. Mean						
Overall Outcomes								
# Moving Outside County	0.06 [0.10] [0.55]	0.82	0.14 [0.12] [0.25]	1.27	0.12 [0.08] [0.14]	0.46	0.11 [0.08] [0.17]	0.50
# Employed Anywhere	0.15 [0.14] [0.27]	2.08	0.20 [0.17] [0.24]	2.85	0.17 [0.13] [0.19]	1.74	0.11 [0.14] [0.43]	1.98
# Employed in Non-Agriculture	0.22 [0.11] [0.05]	1.20	0.27 [0.14] [0.05]	1.78	0.27 [0.10] [0.01]	0.94	0.12 [0.12] [0.32]	1.46
Specific Destination Outcomes								
# Moving to Nairobi	0.13 [0.06] [0.02]	0.23	0.18 [0.08] [0.02]	0.48	0.09 [0.04] [0.02]	0.10	0.09 [0.05] [0.04]	0.17
# Moving to Kisumu	-0.00 [0.03] [0.89]	0.07	-0.03 [0.04] [0.44]	0.18	-0.02 [0.02] [0.28]	0.03	-0.01 [0.02] [0.57]	0.03
# Moving to Eldoret	-0.03 [0.03] [0.29]	0.12	-0.09 [0.05] [0.07]	0.27	-0.04 [0.02] [0.08]	0.06	-0.01 [0.02] [0.67]	0.03
# Employed in Nairobi	0.07 [0.03] [0.02]	0.08	0.20 [0.06] [0.00]	0.22	0.06 [0.03] [0.02]	0.05	0.13 [0.04] [0.00]	0.13
# Employed in Kisumu	0.00 [0.02] [0.79]	0.02	0.01 [0.02] [0.53]	0.04	-0.00 [0.01] [0.74]	0.02	-0.00 [0.01] [0.98]	0.01
# Employed in Eldoret	-0.01 [0.01] [0.36]	0.03	-0.00 [0.02] [0.97]	0.05	-0.01 [0.01] [0.25]	0.02	-0.00 [0.01] [0.99]	0.01
Number of Observations	485		454		485		454	

An observation is a family (origin household + migrants). An outcome is the number of family members who migrated or found employment. Each cell shows a regression of an outcome on an indicator for assignment to the ULM information treatment group. Migration and employment outcomes for specific destinations refer to new migration after the ULM treatment in January 2017. *Cumulative effect* refers to the time interval from the information treatment to the 1 or 2-year follow-up survey (e.g., treated families sent 0.14 more migrants to Nairobi over the year following information provision). *Status in reference month* refers to migration or employment status in the months of February 2018 or March 2019 for the 1 and 2-year follow-ups respectively (e.g., treated families had 0.07 more new migrants living in Nairobi as of February 2018). Results are estimated through post-double LASSO regression (Belloni et al. 2014). Robust standard errors in parentheses; two-sided p-values testing a zero treatment effect in brackets.

Unwinsorized Table F 3: ULM Information Increases Total Reported Income and Financial Well-Being

	ITT	Control Mean	N
Total Income	81.0 (23.9) [0.00]	153.7	939
Income Earned in Nairobi	33.5 (16.41) [0.04]	21.7	939
Remittances to Origin Household	7.39 (4.35) [0.09]	10.9	896
Savings	6.29 (3.52) [0.07]	13.4	896
Food Expenditure	4.11 (2.28) [0.07]	37.3	896
Reports Healthy Finances = 1	0.091 (0.03) [0.01]	0.55	896
Mental Health (MHI-5) Index at Origin	0.24 (0.10) [0.01]	0	435

Currency units are USD/month. An observation is a family (origin household + migrants) in a post-treatment year. Income and remittances are measured at the individual level and aggregated up to the family level. Savings and food expenditure are measured for the total origin household and added to migrant values. *Reports healthy finances* is a dummy = 1 if the origin household head reports not being concerned about the household's financial situation. *Mental health index* is a standardized measure of mental health of the origin household head and is only measured in the 2019 follow-up survey. Data collected from household surveys and phone surveys of individual household members. Income and migration data collected from neighbors at the origin for 43 households which could not be located during follow-up. ITT results estimated from a regression of an outcome on an indicator for assignment to the ULM information treatment group, the pre-treatment value of the outcome, and a time fixed effect. Results are estimated through post-double LASSO regression (Belloni et al. 2014). Standard errors in parentheses are clustered at the family level; two-sided p-values testing a zero treatment effect are in brackets.

Unwinoized Table F 4: Strategic Misreporting Incentives Predict Low Beliefs About Migrant Income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Perceived Migrant Income							
True income	0.15 (0.025) [0.00]	0.15 (0.025) [0.00]	0.13 (0.036) [0.00]	0.14 (0.026) [0.00]	0.13 (0.037) [0.00]	0.10 (0.036) [0.00]	0.29 (0.15) [0.07]	0.29 (0.15) [0.06]
Parents' Expected Remittance Share	-54.8 (27.0) [0.04]				-64.4 (26.3) [0.01]	-62.0 (26.8) [0.02]	-11.5 (13.3) [0.39]	-11.5 (13.1) [0.38]
Migrant Can't Share Remit Burden = 1			-38.9 (17.5) [0.03]		-38.3 (15.3) [0.01]	-23.6 (18.5) [0.20]		
Villager Socially Close to Migrant's Parents = 1				-27.8 (23.2) [0.23]	-24.1 (19.8) [0.22]	-20.8 (19.5) [0.29]		
Type of Worker Controls?	Migrants N	Migrants N	Migrants N	Migrants N	Migrants N	Migrants Y	Locals N	Locals Y
Dep. Var. Mean	52.2	52.2	52.2	52.2	52.2	52.2	16.1	16.1
Number of Workers	242	242	181	242	181	181	155	155
Number of Villagers	350	350	323	350	323	323	116	116
Number of Observations	571	571	510	571	510	510	155	155

Each observation is a worker-villager pair (villagers include parents, neighbors, and friends who reside in the origin village). Income units are USD/month. Columns (1)–(6) use a sample of migrant workers; Columns (7)–(8) use a sample of local workers residing in the village. *Perceived income* is the worker's income as reported by the villager; *True income* is the worker's income as reported by the worker. Results in Columns (6) and (8) are estimated by post-double-LASSO regression (Belloni et al. 2014) with a high-dimensional set of worker, villager, and worker \times villager-level controls. Standard errors are two-way cluster-robust (?) at the worker and villager level; two-sided p-values are in brackets.