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THE HALF-LIFE OF HAPPINESS:

POOR SLUM DWELLERS TO A LARGE IMPROVEMENT IN HOUSING

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The Half-Life of Happiness: Hedonic Adaptation in the Subjective Well-Being of Poor Slum Dwellers to a Large Improvement in Housing

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**ABSTRACT**

A fundamental question in economics is whether happiness increases *pari passu* with improvements in material conditions or whether humans grow accustomed to better conditions over time. We rely on a large-scale experiment to examine what kind of impact the provision of housing to extremely poor populations in Latin America has on subjective measures of well-being over time. The objective is to determine whether poor populations exhibit hedonic adaptation in happiness derived from reducing the shortfall in the satisfaction of their basic needs. Our results are conclusive. We find that subjective perceptions of well-being improve substantially for recipients of better housing but that after, on average, eight months, 60% of that gain disappears.

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## 1. Introduction

Some 2,300 years ago, Aristotle posited that the pursuit of happiness and the avoidance of pain "...is a first principle; for it is for the sake of this that we do all that we do." In other words, happiness is what we value, and everything else, including health and material well-being, is valued only to the extent that it makes us happy and helps us to avoid pain. While subjective well-being is positively correlated with material well-being in the short run,<sup>1</sup> a fundamental question arises as to whether the colossal improvement in material conditions that has occurred since the time of Aristotle has made human beings substantially happier or not. If happiness monotonically increases with development, then the enhancement of material well-being should have made human beings many orders of magnitude happier today than they were at the time of Aristotle. Existing evidence indicates, however, that happiness has not really increased over time (Easterlin 1974), suggesting that considerable adaptation has taken place.

The *hedonic adaptation* hypothesis is that there is a psychological process that attenuates the long-term emotional impact of a favorable or unfavorable change in circumstances, such that people's level of happiness eventually returns to a stable reference level (Frederick and Lowenstein 1999). According to the hedonic adaptation hypothesis, then, variations in happiness and unhappiness are merely short-lived reactions to changes in people's circumstances. In other words, while people initially have strong reactions to events that change their material level of well-being, they eventually return to a baseline level of life satisfaction that is determined by their inborn temperament (Diener et al., 2006). In psychology, this idea is known as the *set point theory* and was labeled the *hedonic treadmill* in the seminal work of Brickman and Campbell (1971). Indeed, in a widely cited paper, Brickman et al. (1978) present evidence that lottery winners report life satisfaction levels that are comparable to those of people who did not win a lottery one year after the event.<sup>2</sup>

Frederick and Lowenstein (1999) hypothesized that people do not adapt to shocks in terms of basic necessities that are related to survival and reproduction. This suggests that hedonic

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<sup>1</sup> See, for example, Deaton (2013), Di Tella et al. (2003), and Stevenson and Wolfers (2008).

<sup>2</sup> However, this evidence should be viewed with caution since it is based on a small and selected sample of lottery winners that was then compared with a small, geographically matched and self-selected sample of individuals.

adaptation is manifested the most in people who have achieved a certain level of basic material well-being rather than being a persistent phenomenon that is evenly distributed across all socioeconomic groups. The idea is analogous to the notion of diminishing marginal utility, where the marginal increase in happiness derived from material gain is higher at lower levels of material wealth. The analog in hedonic adaptation is that adaptation is more limited at lower levels of material wealth. In essence, then, the idea is that the happiness levels of the poor do not adapt, or do not adapt completely, to shocks in terms of basic necessities.

In this paper, we present the first piece of experimental evidence on hedonic adaptation among the poor to improvements in the satisfaction of their basic necessities, specifically shelter. The 1948 United Nation Universal Declaration of Human Rights identified housing, along with food and clothing, as a basic requirement for achieving an adequate standard of living.<sup>3</sup> Despite this, almost one billion people, primarily in the developing world, live in urban slums and lack proper housing (United Nations, 2003).<sup>4</sup> Most slum dwellers live in houses with dirt floors and with roofs and walls that are constructed out of waste materials such as cardboard, tin and plastic. These houses do not provide proper protection from inclement weather, are not secure, and are not pleasant to live in. Many have insufficient access to services such as clean water, sanitation and electricity (UN-Habitat, 2003, and Marx et al., 2013).

We use data on subjective perceptions of well-being generated by a large-scale, multi-country randomized field experiment that provided inexpensive, basic housing units to extremely poor populations living in slums in three Latin American countries: El Salvador, Mexico and Uruguay. We test the hedonic adaptation hypothesis using experimentally generated variations in the supply of houses combined with quasi-experimental variations in the length of exposure to the treatment. We find that subjective perceptions of well-being improve substantially upon receipt of improved housing, but that, eight months later, about 60% of that gain disappears. Our results suggest that an at least partial degree of hedonic adaptation

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<sup>3</sup> United Nations, Universal Declaration of Human Rights, Article 25 (1948).

<sup>4</sup> In line with previous work, we define a slum as an overcrowded settlement which affords poor-quality housing and inadequate access to safe water and sanitation and which suffers from insecurity of tenure (UN-Habitat, 2003).

is a common human behavior that is present even among poor populations that experience a major improvement in the level of satisfaction of their basic necessities.

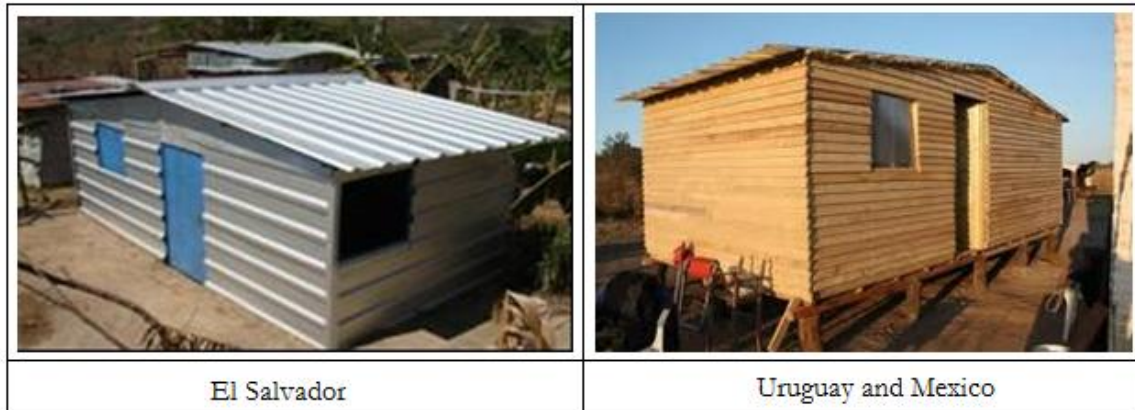
This is the first paper to use experimentally generated variation in order to examine hedonic adaptation and the first to examine adaption by the poor to an improvement in basic needs such as adequate housing. The vast majority of previous economic studies on this topic have used observational data to test whether happiness levels in non-poor settings adapt to negative shocks such as unemployment (Clark and Oswald, 1994, and Winkelman and Winkelman, 1998), disability (Oswald and Powdthavee, 2008), hemodialysis (Riis et al., 2005), major illness (Ferrer-i-Carbonell and Van Praag, 2002, and Groot et al., 2004) and divorce (Clark et al., 2008). A notable exception is Di Tella et al. (2010), who also used observational data to study adaptation to both positive and negative changes in income and status in Germany. Most of this research shows that people revert to their reference level of happiness over time (Graham and Oswald 2010).

## **2. The Experiment**

The houses were supplied by Un Techo Para Mi País (“A Roof for My Country” (TECHO)), a Latin American NGO whose mission is to provide basic, pre-fabricated houses to extremely poor populations with the express goal of improving their well-being. TECHO targets the poorest informal settlements and, within these settlements, the families who live in the most extremely substandard housing. TECHO houses are a significant improvement over existing housing in terms of flooring, roofs and walls (Galiani et al., 2015). The targeted settlements are plagued by a host of problems, including insufficient access to basic utilities (water, electricity and sanitation), significant levels of soil and water contamination, and overcrowding. Typically, houses are rudimentary units constructed from discarded materials, such as cardboard, tin and plastic, and have dirt floors.

TECHO houses are 18 square meters (6m by 3m) in size. The walls are made of pre-fabricated, insulated pinewood panels or aluminum, and the roofs are made of tin and are designed to keep occupants warm and to protect them from humidity, insects and rain. The floors are raised between 30 and 80 cm off the ground to reduce dampness and to protect the occupants from floods and infestations. Although these houses are a major improvement

over the recipients' previous housing, the facilities are limited in that they do not include bathrooms or kitchens or amenities such as plumbing, drinking water hook-ups, or gas connections. The houses cost less than \$1,000, and the beneficiary families contribute 10% of that amount. In El Salvador, this is approximately equivalent to 3 months' earnings, while in Mexico and Uruguay, it is roughly equivalent to 1.4 months' earnings. The following pictures show examples of the types of houses being provided.



TECHO budget constraints limit the number of housing units that can be built at any one time. Under these constraints, TECHO opted to select beneficiaries by means of a lottery system that gives all eligible households within a pre-determined geographical neighborhood an equal opportunity to receive one of the units. TECHO first selected a set of eligible settlements and then conducted a census to identify eligible households within each settlement. The eligible households were then randomly assigned to treatment and control groups. The number of treatments represents a small portion of all the houses in any given settlement.

Since TECHO did not have the capacity to work in all settlements at the same time, the program was rolled out in each country in two phases at the settlement level. Baseline surveys were conducted approximately one month before the start of each phase, while the follow-up surveys were conducted simultaneously for both phases in each country (see Table 1). This process generated variations in the amount of time that beneficiaries had occupied the house at the time of the follow-up survey. Phase I settlements had 24 months of exposure, on average, while Phase II settlements had an average of 16 months of exposure implying a difference in 8-months on average.

Our sample includes a total of 74 settlements, of which 29 were in Phase I and 45 in Phase II. The total number of eligible households in these settlements was 2,373. Treatment was offered to 57% of the households, and over 85% of those households actually received a new house (see Galiani et al., 2015), since about 15% of the households that were assigned to treatment were unable to afford the required 10% co-payment and hence did not receive a house. The compliance rate with the treatment is balanced across intention-to-treat groups and phases. Attrition rates from the sample were 6% of the households in the assigned-to-treatment group and 7% of those in the control group. This difference is not statistically significant at conventional levels (see Table 2). The difference between the attrition rates of the assigned-to-treatment and control groups in the two phases was not statistically significant either.

Under randomization, the outcomes of the assigned-to-treatment and control groups should be equal, on average, prior to treatment. Galiani et al. (2015) tested for the null hypothesis of no difference between the groups for a large set of variables measured at baseline which included socioeconomic characteristics, housing characteristics, assets, satisfaction with quality of housing and life, security, education, and health. The analysis indicates that there was a statistically significant difference between groups for only 4 out of 44 variables at conventional levels, which is about what would be expected to occur by chance. The test results show that the samples were balanced in each of the countries, as was the sample when pooled across all the countries.

### 3. Identification Strategy

We report estimates of intention-to-treat effects by time of exposure (phase) for a number of indicators of subjective well-being. Operationally, we estimate the following regression model:<sup>5</sup>

$$Y_{ij} = \alpha + \gamma_1 Treat_{ij} + \gamma_2 Treat_{ij} * PhaseI_{ij} + \beta X_{ij} + \mu_j + \varepsilon_{ij} \quad (1)$$

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<sup>5</sup>The variables under study are limited dependent variables (LDVs). The problem posed by causal inference with LDVs is not fundamentally different from the problem of causal inference with continuous outcomes. If there are no covariates or the covariates are sparse and discrete, linear models are no less appropriate for LDVs than for other types of dependent variables. This is certainly the case in a randomized control trial where controls are included only in order to improve efficiency, but their omission would not bias the estimates of the parameters of interest.

where  $Y_{ij}$  is subjective well-being for household  $i$  living in settlement  $j$ ;  $Treat_{ij}$  is a dummy variable equal to 1 if family  $i$  in settlement  $j$  was offered a TECHO house and 0 otherwise;  $PhaseI_{ij}$  is a dummy variable equal to 1 if settlement  $j$  was treated in phase I and 0 otherwise;  $X_{ij}$  is a vector of household characteristics measured at baseline;  $\mu_j$  is a settlement fixed effect; and  $\varepsilon_{ij}$  is the error term.

The settlement fixed effects capture the average unobservable differences across settlements (and hence countries). This is important since randomization was conducted within each settlement. One point that is of particular importance is that settlement fixed effects control for differences in the reference points for subjective well-being that may vary geographically. Controlling for settlement fixed effects, we assume that the error terms are independent and thus report only robust standard errors.<sup>6</sup>

The parameters of interest are  $\gamma_1$ , the treatment effect for Phase II (short exposure) households;  $\gamma_1 + \gamma_2$ , the treatment effect for Phase I (long exposure) households; and  $\gamma_2$ , the degree of hedonic adaptation – i.e., the difference in the treatment effect between Phase I (long exposure) and Phase II (short exposure). A negative  $\gamma_2$  is consistent with at least partial hedonic adaptation. If  $\gamma_2$  fully offsets  $\gamma_1$ , then we have full or complete hedonic adaptation, i.e., subjective well-being returned to its reference level.

Our identification strategy is two-fold. First, random assignment of treatment status guarantees treatment exogeneity, both overall and within phases, and thus provides the identification for both  $\gamma_1$  and  $\gamma_2$ . Galiani et al. (2015) demonstrated that the overall sample was balanced over a large number of characteristics, and in Table 3 we further show that the samples are balanced within phases.

Second, a negative and significant  $\gamma_2$  could be interpreted as evidence of hedonic adaptation only if the samples in both phases started from the same level of subjective well-being. This would be the case if the allocation of settlements to phases in each country were orthogonal to their characteristics. Indeed, even though the time of exposure to the treatment was not randomly assigned, we cannot reject the null hypothesis of no differences in baseline

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<sup>6</sup> As long as the phasing design of the intervention is given at settlement level, then there is no within-settlement variation in phase. Thus, controlling for phase effects makes no sense, since phase and settlement fixed effects span the same subspace.



subjective well-being outcomes and covariates between Phase I and Phase II settlements (see Table 3). In particular, these results show that populations from Phases 1 and 2 were statistically comparable before treatment, thereby lending credibility to our interpretation of  $\gamma_2$  as a measure of hedonic adaptation. Note that pre-treatment measures are also statistically balanced across intention-to-treat groups within each phase. Hence, potential time effects are controlled for by our experimental design.

#### 4. Results

We report the results reported in Table 4 for two different specifications of equation (1) – one with and one without a set of control variables.<sup>7,8</sup> The specific control variables are listed in the notes to Table 4. This table presents estimates of  $\gamma_1$  and  $\gamma_2$  on ordinal self-reported measures of satisfaction with the housing unit (satisfaction with floor quality, satisfaction with wall quality, satisfaction with roof quality, and satisfaction with protection afforded by the house when it rains) as well as with an overall self-reported measure of quality of life. In each model, we also report the p-statistic for an F-test of the null hypothesis of full hedonic adaptation to the TECHO house ( $\gamma_1 + \gamma_2 = 0$ ).

First of all, treatment substantially increased the subjective well-being of beneficiaries in Phase II (short exposure). They are happier with their houses and with their lives once they have received their TECHO houses.<sup>9</sup> This is systematic for all self-reported measures of satisfaction and is robust across models. While their satisfaction with housing quality increases by between 54% and 97%, gains in their subjective general well-being are only about 40%. This relatively small effect on satisfaction with quality of life compared to the sizable effects on satisfaction with housing quality is not surprising, as housing is only part of what determines quality of life.

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<sup>7</sup> Table A1 provides a detailed definition and sample size for each variable considered in this study.

<sup>8</sup> The statistical inference of our results is robust to clustering the standard errors at the settlement level since rejection decisions of the null hypothesis remain the same at conventional levels of statistical significance. This result lends credibility to our assumption that the settlement fixed effect captures the systematic unobserved differences across slums. These results are available upon request.

<sup>9</sup> In order to interpret these results more accurately, it is important to note that, for all the outcome variables considered in this study, there was no instance in which the average outcome for the control group decreased between the baseline and follow-up measures (see Galiani et al., 2015).

The gains in subjective well-being afforded by an improvement in the satisfaction of basic needs (in this case, housing) do not appear to be sustained over time, as indicated by the negative estimates of  $\gamma_2$ . The treatment effect on satisfaction with quality of life is around 12 percentage points, or 60% lower in households treated in Phase I compared with those treated in Phase II.<sup>10</sup> However, we reject the null hypothesis of full adaptation in satisfaction with quality of life. After eight months of additional exposure to the treatment, on average, TECHO beneficiaries partially adapted but were still happier compared to the reference level for no treatment. With respect to satisfaction with housing quality (floor, roof, walls and protection from rain), we find overall positive effects from treatment that decrease from short to long exposure by between 41% and 55%. Again, the results are consistent with partial but not full hedonic adaptation.

The results are displayed in Figure 1 for satisfaction with quality of life and with various aspects of the quality of housing. For each variable, the first bar represents the mean level of satisfaction for the control group measured at follow-up, while the next bar represents the mean level of satisfaction of the treatment group measured 16 months after construction, on average, and the last bar represents the mean level of satisfaction of the treatment group 24 months after construction and is estimated as the mean of the control group plus the treatment effect for the Phase I group. The difference between the first bar and the second bar is the treatment effect on subjective well-being for the Phase II group, and the difference between the second bar and the third is interpreted as hedonic adaptation. While the third bar is lower than the second bar, it is still higher than the first bar, which is consistent with partial but not total adaptation.

In Table 5, we report the results separately for each country. While the direction of the hedonic adaptation effect is consistent across countries, the estimate is only statistically significant for the case of Mexico (see Table 5). However, the estimated magnitudes are the same for El Salvador and Mexico and only slightly lower for Uruguay. Both El Salvador and Uruguay has smaller sample sizes than Mexico explaining some of the lack of statistical

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<sup>10</sup> Due to a problem with data collection in the follow-up survey in El Salvador, the non-response to this question was differentially greater for the control group. Thus, to be on the safe side, we randomly impute a value equal to 1 ("satisfied with quality of life") to 84 missing values in the control group observations, which reduces the non-response rate for this variable from 43% to 7% (the same level as recorded for the intention-to-treat group). Without performing this imputation,  $\gamma_1$  and  $\gamma_2$  are 0.261 and -0.165, respectively, for Model 1 and 0.262 and -0.165, respectively, for Model 2.

significance. In addition, we cannot reject the null hypothesis that the estimated coefficients on treatment and the estimated coefficient on treatment  $\times$  Phase I are jointly equal for all countries (see p-value for F-Test of Pooling Countries). The evidence is robust across models, rendering some credibility to the external validity of the results.

Finally, one concern regarding our interpretation of the results is that housing quality may have deteriorated over time. We test for this possibility by estimating equation (1) for various measures of housing quality. In general, the results reported in Table 6 show no difference in satisfaction with housing quality between Phase I and Phase II.

## **Conclusion**

A fundamental question in economics is whether happiness increases *pari passu* with material conditions or whether humans grow accustomed to better conditions over time. We use data from a large-scale, multi-country field experiment to examine what kind of impact the provision of housing to extremely poor slum dwellers in Latin America has on subjective well-being and to test whether poor populations display hedonic adaptation to the happiness derived from reducing the shortfall in the satisfaction of their basic need for housing. To the best of our knowledge, we are the first to test the hypothesis of hedonic adaptation to a change in the level of satisfaction of basic necessities among poor populations. This is also the first study in the literature to exploit experimental variability to test the hypothesis of hedonic adaptation.

Our results are conclusive. We find that subjective perceptions of well-being improve substantially for recipients of improved TECHO housing but that after, on average, eight months, 60% of that gain disappears. Our results are consistent with the theoretical work of Pollak (1970), Wathieu (2004), Rayo and Becker (2007), and Graham and Oswald (2010).

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Table 1. Length of Exposure and Sample Sizes

	Phase I Construction	Phase II Construction	Combined
<b>El Salvador</b>			
Average Exposure	25 months	17 months	
Household Sample Size	288	368	656
Number of Settlements	8	15	23
<b>Uruguay</b>			
Average Exposure	27 months	17 months	
Household Sample Size	353	375	728
Number of Settlements	6	6	12
<b>Mexico</b>			
Average Exposure	20 months	15 months	
Household Sample Size	286	540	826
Number of Settlements	15	24	39
<b>All Countries</b>			
Average Exposure	24 months	16 months	
Household Sample Size	927	1,283	2,210
Number of Settlements	29	45	74

Table 2: Sample Size, Attrition and Compliance, by Assignment Status

	Phase I		Phase II		Combined Phases I and II		Phase I vs Phase II	
	Treatment	Control	Treatment	Control	Treatment	Control	Phase I	Phase II
Baseline Number of Households	653	342	703	675	1,356	1,017	995	1378
Follow-Up Number of Households	611	316	658	625	1,269	941	927	1283
Attrition Rate	0.06	0.08	0.06	0.07	0.06	0.07	0.07	0.07
Assignment Compliance	0.88	0.99	0.86	1.00	0.87	1.00	0.92	0.93

Table 3: Baseline Balance Within and Between Phases

	Phase I			Phase II			Phase I vs Phase II		
	Treat.	Control	Diff.	Treat.	Control	Diff.	Phase I	Phase II	Diff.
Satisfaction with Floor Quality	0.19 (0.02)	0.21 (0.02)	0.01 (0.03)	0.25 (0.02)	0.27 (0.02)	0.01 (0.02)	0.20 [0.02]	0.26 [0.04]	-0.06 [0.04]
Satisfaction with Wall Quality	0.15 (0.01)	0.18 (0.02)	-0.02 (0.03)	0.16 (0.01)	0.16 (0.01)	0.02 (0.02)	0.16 [0.02]	0.16 [0.02]	-0.01 [0.03]
Satisfaction with Roof Quality	0.17 (0.01)	0.20 (0.02)	-0.02 (0.03)	0.16 (0.01)	0.17 (0.01)	0.02 (0.02)	0.18 [0.02]	0.16 [0.02]	0.01 [0.03]
Satisfaction with Rain Protection	0.15 (0.01)	0.18 (0.02)	-0.01 (0.03)	0.15 (0.01)	0.14 (0.01)	0.03 (0.02)	0.17 [0.02]	0.14 [0.02]	0.02 [0.03]
Satisfaction with Quality of Life	0.28 (0.02)	0.25 (0.02)	0.02 (0.03)	0.28 (0.02)	0.27 (0.02)	0.01 (0.02)	0.27 [0.02]	0.27 [0.03]	0.00 [0.03]
Assets Per Capita (USD)	58.54 (6.50)	49.38 (4.33)	-0.16 (9.02)	45.25 (2.92)	42.13 (2.57)	-0.92 (3.97)	48.75 [4.93]	45.23 [2.98]	3.52 [5.71]
Monthly Income Per Capita (USD)	59.85 (4.29)	49.45 (2.63)	-8.61 (5.99)	58.74 (2.94)	52.86 (2.54)	-5.08 (4.32)	53.08 [4.01]	55.77 [4.27]	-2.69 [5.82]
Head's Years of Schooling	4.09 (0.14)	4.34 (0.20)	-0.01 (0.21)	4.37 (0.12)	3.87 (0.12)	0.26 (0.17)	4.18 [0.52]	4.13 [0.29]	0.05 [0.59]
Head's Gender	0.69 (0.02)	0.69 (0.02)	-0.01 (0.03)	0.69 (0.02)	0.71 (0.02)	0.00 (0.02)	0.69 [0.04]	0.70 [0.03]	-0.01 [0.05]
Head's Age	42.09 (0.63)	41.33 (0.77)	0.52 (1.07)	41.20 (0.59)	40.73 (0.61)	1.01 (0.87)	41.83 [0.95]	40.97 [0.70]	0.86 [1.17]

Note: This table reports baseline means and differences in means of the analysis sample. For Phase I and Phase II columns, differences in means are estimated by regressions that include settlement fixed effects, and robust standard errors are reported in parentheses. For the Phase I vs Phase II columns, standard errors clustered at the settlement level are reported in brackets. In the case of monetary variables, observations over the 99<sup>th</sup> percentile were excluded. \*Significant at 10%. \*\*Significant at 5%. \*\*\*Significant at 1%.



Table 4: Hedonic Adaptation in Satisfaction with Quality of Life and Housing Characteristics

	Mean Control Group	Model 1		Model 2	
		Treatment	Treatment × Phase I	Treatment	Treatment × Phase I
Satisfaction with Quality of Life	0.53	0.20 (0.03) <sup>***</sup>	-0.12 (0.05) <sup>***</sup>	0.20 (0.03) <sup>***</sup>	-0.12 (0.05) <sup>***</sup>
<i>p</i> -value (Treat + Treat×Phase I = 0)		0.04		0.04	
Satisfaction with Floor Quality	0.37	0.20 (0.03) <sup>***</sup>	-0.05 (0.05)	0.20 (0.03) <sup>***</sup>	-0.05 (0.05)
<i>p</i> -value (Treat + Treat×Phase I = 0)		0.00		0.00	
Satisfaction with Wall Quality	0.30	0.29 (0.03) <sup>***</sup>	-0.16 (0.05) <sup>***</sup>	0.29 (0.03) <sup>***</sup>	-0.16 (0.05) <sup>***</sup>
<i>p</i> -value (Treat + Treat×Phase I = 0)		0.00		0.00	
Satisfaction with Roof Quality	0.32	0.29 (0.03) <sup>***</sup>	-0.12 (0.05) <sup>***</sup>	0.29 (0.03) <sup>***</sup>	-0.12 (0.05) <sup>***</sup>
<i>p</i> -value (Treat + Treat×Phase I = 0)		0.00		0.00	
Satisfaction with Rain Protection	0.29	0.25 (0.03) <sup>***</sup>	-0.12 (0.05) <sup>***</sup>	0.25 (0.03) <sup>***</sup>	-0.13 (0.05) <sup>***</sup>
<i>p</i> -value (Treat + Treat×Phase I = 0)		0.00		0.00	

Note: Each row represents a separate dependent variable. The first column reports the mean of the dependent variable for the control group measures at follow-up. The next two columns, under the heading Model 1, report the results of a regression of the dependent variable on treatment assignment and treatment assignment interacted with Phase I plus settlement fixed effects. Reports are the estimated coefficients and robust standard errors. The last two columns, under the heading Model 2, additionally control for the household head's years of schooling, gender and age, as well as the value of household assets per capita and monthly income per capita, all of which were measured during the baseline round. Following the standard procedure, when a control variable has a missing value, we impute a value equal to 0 and add a dummy variable equal to 1 for that observation, which indicates that the control variable was missed. Finally, we report the *p*-values of F-tests of the null hypothesis that the estimated coefficient on treatment + the estimated coefficient on treatment × Phase I = 0 for each model. \*Significant at 10%. \*\*Significant at 5%. \*\*\*Significant at 1%.

Table 5: Hedonic Adaption in Satisfaction with Quality of Life, by Country

	Sample Size	Mean Control Group	Model 1		Model 2	
			Treatment	Treatment × Phase I	Treatment	Treatment × Phase I
El Salvador	606	0.51	0.25 (0.05)***	-0.13 (0.10)	0.25 (0.06)***	-0.13 (0.10)
Uruguay	715	0.45	0.13 (0.05)**	-0.07 (0.08)	0.13 (0.05)**	-0.07 (0.08)
Mexico	822	0.60	0.22 (0.04)***	-0.14 (0.07)**	0.22 (0.04)***	-0.14 (0.07)**
All Countries	2,143	0.53	0.20 (0.03)***	-0.12 (0.05)***	0.20 (0.03)***	-0.12 (0.05)***
<i>p</i> -value for F-test of Pooling Countries			0.54		0.50	

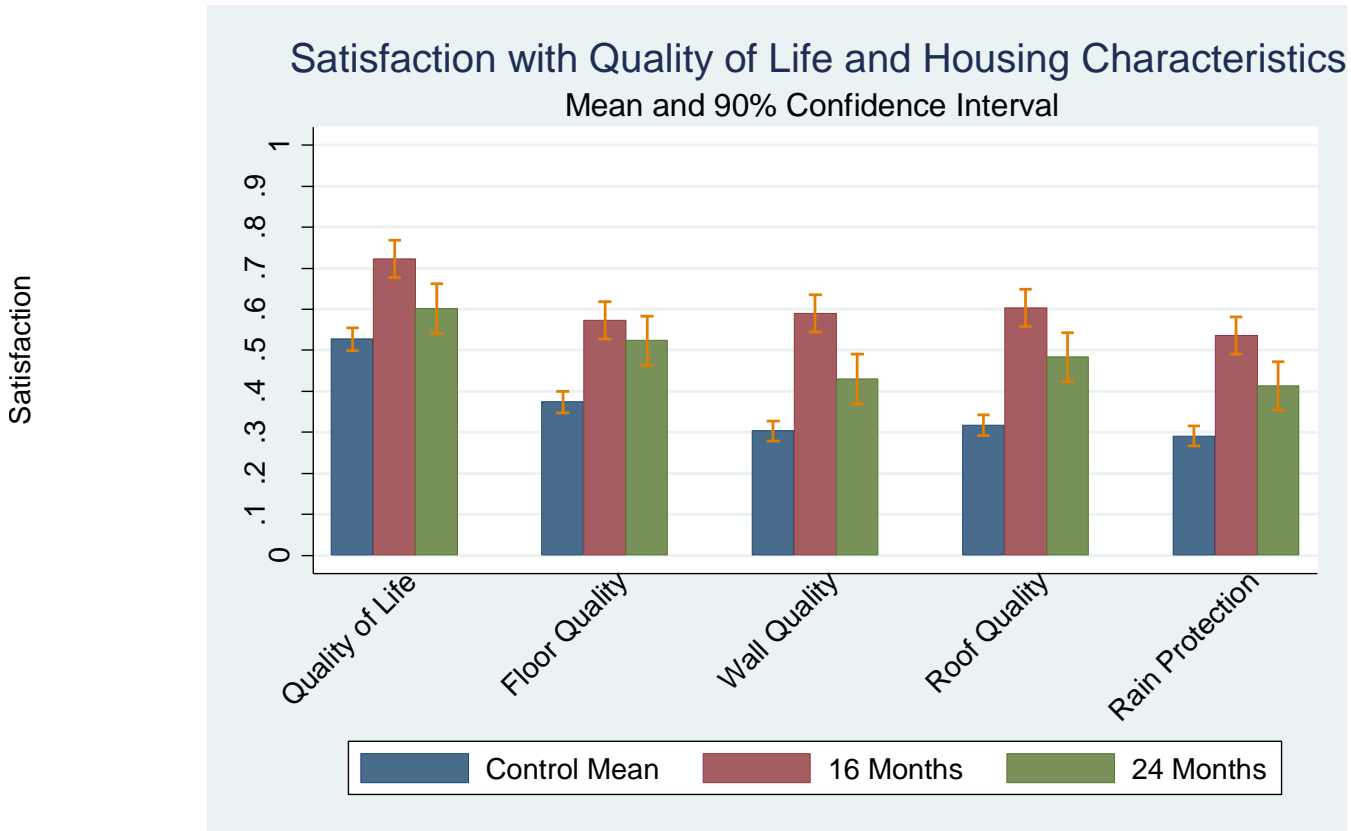
Note: The first column reports the sample size. The second column reports the mean of the dependent variable for the control group measures at follow-up. The next two columns, under the heading of Model 1, report the results of a regression of the dependent variable on treatment assignment and treatment assignment interacted with Phase I plus settlement fixed effects. Reports are the estimated coefficients and robust standard errors. The last two columns, under the heading of Model 2, additionally control for the household head's years of schooling, gender and age, as well as the value of household assets per capita and monthly income per capita, all of which were measured during the baseline round. Following the standard procedure, when a control variable has a missing value, we impute a value equal to 0 and add a dummy variable equal to 1 for that observation, which indicates that the control variable was missed. Finally, we report the *p*-values of F-tests of the null hypothesis that the estimated coefficients on treatment and the estimated coefficient on treatment × Phase I are jointly equal to all countries for each model. \*Significant at 10%. \*\*Significant at 5%. \*\*\*Significant at 1%.

Table 6: Adaptation in Housing Quality

	Mean Control Group	Model 1		Model 2	
		Treatment	Treatment $\times$ Phase I	Treatment	Treatment $\times$ Phase II
Number of Rooms	3.09	0.27 (0.08)***	-0.23 (0.14)*	0.26 (0.08)***	-0.22 (0.14)
Share Rooms Good Quality Floors	0.44	0.18 (0.02)***	-0.01 (0.03)	0.19 (0.02)***	-0.01 (0.03)
Share Rooms Good Quality Walls	0.35	0.20 (0.02)***	-0.06 (0.04)*	0.20 (0.02)***	-0.06 (0.04)*
Share Rooms Good Quality Roof	0.43	0.17 (0.02)***	-0.02 (0.03)	0.17 (0.02)***	-0.01 (0.04)
Share Rooms with Windows	0.36	0.18 (0.02)***	-0.02 (0.03)	0.18 (0.02)***	-0.02 (0.03)

Note: Each row represents a separate dependent variable. The first column reports the mean of the dependent variable for the control group measures at follow-up. The next two columns, under the heading Model 1, report the results of a regression of the dependent variable on treatment assignment and treatment assignment interacted with Phase I plus settlement fixed effects. Reports are the estimated coefficients and robust standard errors. The last two columns, under the heading Model 2, additionally control for the household head's years of schooling, gender and age, as well as the value of household assets per capita and monthly income per capita, all of which were measured during the baseline round. Following the standard procedure, when a control variable has a missing value, we impute a value equal to 0 and add a dummy variable equal to 1 for that observation, which indicates that the control variable was missed. \*Significant at 10%. \*\*Significant at 5%. \*\*\*Significant at 1%.

Figure 1



Note: This figure displays the estimated parameters reported in Table 4. The groups of bars represent estimated satisfaction with quality of life and various aspects of the quality of housing. The first bar denotes the mean level of satisfaction for the control group measured at follow-up. The next bar represents the mean level of satisfaction for the treatment group measured 16 months after construction, on average. It is computed as the mean of the control group plus the treatment effect for Phase II. The last bar represents the mean level of satisfaction of the treatment group 24 months after construction on average, and is estimated as the mean of the control group plus the treatment effect for the Phase I group. The difference between the first bar and the second bar represents the effect of the treatment on the subjective level of well-being for the Phase II group, and the difference between the second and third bar can be interpreted as the extent of hedonic adaptation.

Table A1: Description of Variables and Sample Sizes. Intention to Treat Groups. Follow Up Survey

Variable	Description	Phase I		Phase II		All	
		Obs. Control	Obs. Treat.	Obs. Control	Obs. Treat.	Obs. Control	Obs. Treat.
Monthly Income Per Capita (USD)	Monthly Income per capita in US dollars of July 2007. It is calculated as the sum of the monthly earnings of each household's member divided by the household size.	265	513	532	557	797	1,070
Assets Value Per Capita (USD)	Total Asset Value per capita reported by the household.	316	611	625	658	941	1,269
Head of HH's Age	Age of head of household in years.	312	601	618	651	930	1,252
Head of HH's Gender	Indicator equal to one if the head of household is a man.	316	611	625	658	941	1,269
Head of HH's Years of Schooling	Years of Schooling of head of household equivalent to the higher level of education reached.	313	594	609	649	922	1,243
Satisfaction with Floor Quality	Indicator equal to one if the respondent reports being satisfied or very satisfied with the quality of floors, measured by a Likert scale of 4 categories: "Unsatisfied", "Regular", "Satisfied", "Very Satisfied".	313	606	623	657	936	1,263
Satisfaction with Wall Quality	Indicator equal to one if the respondent reports being satisfied or very satisfied with the quality of walls, measured by a Likert scale of 4 categories: "Unsatisfied", "Regular", "Satisfied", "Very Satisfied".	313	607	623	657	936	1,264
Satisfaction with Roof Quality	Indicator equal to one if the respondent reports being satisfied or very satisfied with the quality of roofs, measured by a Likert scale of 4 categories: "Unsatisfied", "Regular", "Satisfied", "Very Satisfied".	313	607	623	657	936	1,264
Satisfaction with Rain Protection	Indicator equal to one if respondent reports being satisfied or very satisfied with the house's protection against water when it rains, measured by a Likert scale of 4 categories: "Unsatisfied", "Regular", "Satisfied", "Very Satisfied".	313	607	623	657	936	1,264
Satisfaction with Quality of Life	Indicator equal to one if respondent reports being satisfied or very satisfied with the quality of life of her family in that house, measured by a Likert scale of 4 categories: "Unsatisfied", "Regular", "Satisfied", "Very Satisfied".	293	584	622	644	915	1,228
Number of Rooms	Number of rooms in the terrain (observed by the enumerator).	316	610	625	658	941	1,268
Share Rooms Good Quality Floors	Proportion of rooms with floors made of good quality materials like cement, brick, or wood (observed by the enumerator).	312	608	625	658	937	1,266
Share Rooms Good Quality Walls	Proportion of rooms with walls made of good quality materials like wood, cement, brick or zinc metal (observed by the enumerator).	316	610	621	658	937	1,268
Share Rooms Good Quality Roof	Proportion of rooms with roofs made of good quality materials like cement, brick, tile and zinc metal (observed by the enumerator).	315	609	623	657	938	1,266
Share Rooms with Windows	Proportion of rooms with at least 1 window (observed by the enumerator).	315	610	625	658	940	1,268

