

Spousal Communication and Information Sharing: Evidence from Migrants and their Spouses*

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Abstract

Do spouses misreport information to each other to influence household decision-making? I analyze this question using a novel field experiment among Filipino migrants in the UAE and their spouses staying behind in the Philippines. Both migrants and their spouses staying behind have biased beliefs about each other's finances. By experimentally varying spousal observability of reported information, I show that spouses staying behind underreport their income by 31 percent when it is observable to migrants. Among both migrants and their spouses staying behind, women are more likely to underreport income. Income is underreported when migrants do not communicate about or demand control over the household's finances. These reporting patterns are consistent with a theory of strategic misreporting to influence migrant remittances.

Keywords: Asymmetric information, hidden income, migration, remittances

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1 Introduction

Although most models of household decision-making assume perfect information (Chiappori, 1988, 1992; Lundberg & Pollak, 1993), recent theoretical and empirical work has shown that spouses may have private information and may strategically use this information to influence resource allocation decisions (Ashraf, 2009; Ashraf *et al.*, 2014; Castilla & Walker, 2013; Chen, 2006). This is especially relevant for transnational households—where one spouse temporarily migrates for work and sends remittances to the spouse staying behind.¹ The remittance decision is made under considerable information asymmetry as migrants and their spouses staying behind have limited ability to observe or control each other’s actions. This information asymmetry leads to fewer remittances (Joseph *et al.*, 2018; Ambler, 2015), lower savings (Ashraf *et al.*, 2015), more resources spent on monitoring (De Laat, 2014), and biased beliefs about the returns to migration (Baseler, (forthcoming); McKenzie *et al.*, 2013). While the effects of information asymmetry are well established, its causes are less understood. In particular, the persistence of information asymmetry despite regular communication between migrants and their spouses staying behind remains puzzling.²

In this paper, I analyze if this information asymmetry can be explained by migrants and their spouses misreporting information to each other. I first document the extent of information asymmetry between migrants and their spouses staying behind across multiple margins. Next, I analyze information sharing between migrants and their spouses to determine if their reporting patterns are consistent with a theory of strategic misreporting. The defining characteristic of misreporting is that individuals are purposefully falsifying information making it inherently difficult to identify. I address this challenge by using a novel

¹These remittances are economically significant intra-household transfers and the primary motivation for most temporary migration. In 2016, remittances sent to developing countries amounted to USD \$429 billion, roughly three times official development aid (World Bank, 2017).

²While communication can reduce information frictions (Batista & Narciso, 2018), it can instead create or exacerbate information asymmetry if spouses purposefully misreport information to each other to influence the remittance decision in their favor. Ambler (2015) distinguishes between strategic information asymmetries that are created by strategic behavior and inadvertent information asymmetries that arise due to communication barriers. Based on her framework, spousal communication can be used to create strategic information asymmetries or reduce inadvertent information asymmetries.

experimental strategy to vary spousal observability of reported information.

My research design is based on the simple idea that if migrants and their spouses strategically misreport information to each other, they will differentially report this information when it is observable to the other spouse compared to when it is not. I implement this design in the context of transnational households in the UAE-Philippines migration corridor. I invite married temporary Filipino migrants in the UAE and their spouses staying behind in the Philippines to separately participate in a survey. The survey is described to participants as a research activity to create awareness about the experience of Filipino migrants in the UAE and their households in the Philippines. In the survey, I collect data on income, expenses, and employment, with the migrant reporting their information in the UAE and the spouse staying behind reporting theirs in the Philippines. I elicit the causal effect of spousal observability by experimentally varying whether the information reported by an individual in the survey is observable to their spouse. Participants in the control group are informed that their responses will be kept private and not shared with their spouses, whereas participants in the treatment group are informed that their responses will be observable to and shared with their spouses. Information is shared, based on the treatment status, after all surveys have been completed. Participants know their treatment status when the information is collected. If migrants and their spouses strategically misreport information to each other, I should observe differences between the information reported by the treatment and the control groups.

I document four findings. First, both migrants and their spouses have biased beliefs about each other's finances. Migrants underestimate their spouses' income and overestimate their spouses' expenses, whereas spouses staying behind underestimate migrants' less-observable non-wage benefits. Second, spouses staying behind underreport their monthly income by 31 percent (213 dirham or USD \$58) when it is observable to the migrant, compared to their reported monthly income of 685 dirham (USD \$186) when it is not observable to the migrant. This underreporting is even greater when the migrant also participates in the study. Third,

among both migrants and their spouses staying behind, women are more likely to underreport income. The majority of spouses staying behind are women, and they play a central role in driving the underreporting of income by spouses staying behind. These gender differences appear to be driven by women limiting misreporting by men by more frequently demanding control over and communicating about the household's finances. Fourth, underreporting is greater when information is more difficult to observe and less likely to be verified. Spouses staying behind underreport income on the intensive margin by underreporting known sources of income instead of reporting zero income which would be easier for migrants to verify as misreporting. Underreporting only occurs when migrants do not demand control over or regularly communicate about the household's finances, making them less likely to verify reported information. Together these reporting patterns are consistent with the theory that spouses staying behind strategically underreport their income to influence the remittance decision and this contributes to the information asymmetry between migrants and their spouses.

The prior literature on asymmetric information in transnational households is comprised of non-experimental and experimental studies focused on income hiding by the remittance sender. I expand on this work by first presenting a conceptual framework for and then robustly analyzing reporting behavior on *both sides* of the remittance relationship, across *multiple* margins of the household's *actual* finances. The key challenge in identifying strategic misreporting as the cause of information asymmetry in non-experimental settings is that spousal communication is not observed. These studies must infer strategic misreporting as the mechanism for other observed outcomes. Using this strategy, [Seshan & Zubrickas \(2017\)](#) show that wives in India underestimate their husbands' earnings in Qatar and the underestimation is associated with lower remittances. [Joseph et al. \(2018\)](#) show that remittances from the UAE respond more to observable shocks in migrant income than unobservable shocks. [Baseler \(\(forthcoming\)\)](#) and [McKenzie et al. \(2013\)](#) show that migrant-sending households in Kenya and potential migrants in Tonga, respectively, underestimate the returns to mi-

gration despite significant information flows between migrants and household members.³ In contrast, I directly observe spousal information-sharing which allows me to analyze it as a potential cause for information asymmetry in transnational households, filling a key gap in the literature. The level of information asymmetry I find in this setting is comparable to results from other migration corridors and my experimental results show that this information asymmetry is matched by income underreporting of a similar magnitude (see Appendix Table A.III for a comparison of effect sizes).

Gender plays a crucial role in understanding household decision making. However, in the context of transnational households, the composition of migrants often leans heavily towards either men or women, making it difficult to distinguish the effect of gender from migrant status on household decision making. My setting of Filipino migrants in the UAE offers a better gender balance, with women comprising 38% of the migrant sample. This allows me to show important gender differences in information sharing, irrespective of migrant status.

Lab and lab-in-field experiments also provide settings where spousal communication and decision-making can be directly observed.⁴ These studies find that migrants respond to increased information sharing by sending more remittances. Salvadoran migrants in the US remit more when their choice of how much to remit is revealed to recipients (Ambler, 2015), and Filipino migrants in Italy remit more when they can label remittances with their intended purpose (De Arcangelis *et al.*, 2015). I move this research agenda forward by analyzing migrants and their spouse's decisions to hide or reveal income. In addition, by analyzing information sharing about the household's actual finances my results are not limited to decision-making over one-time windfall gains.⁵

³For co-residing households, Ambler *et al.* (2021) show that differences in spousal survey responses about bargaining power are associated with differences in household outcomes that suggest the presence of hidden assets.

⁴For co-residing households, Ashraf (2009) and Castilla & Walker (2013) show that spouses strategically use private information and lack of communication for personal gain; Jakiela & Ozier (2015) show that women forgo returns by choosing investment strategies that allow them to hide income to prevent having to share returns with their relatives.

⁵These lab and lab-in-field studies accede that their findings may be limited to decision-making over windfall gains. Households may treat income from unanticipated lottery winnings differently from their permanent income, and the stakes involved in hiding or sharing these winnings may also be considerably

Understanding and modeling information sharing in transnational households has important implications for a range of household level outcomes. There is a growing interest in leveraging information sharing as a means to improve financial decision-making and outcomes, including maximizing the efficacy of remittances as a form of insurance, but experimental evaluations have found mixed results.⁶ *Ashraf et al. (2015)* show that Salvadoran migrants save more when they have access to bank accounts at home that offer greater control over savings. However, *Ambler et al. (2015)* find no demand for a remittance product that channels funds directly to education, unless it is bundled with a subsidy. Although I do not directly study these outcomes, my results add to this body of knowledge by showing that spousal communication and information-sharing is an important margin to consider in analyzing decision-making, control and the design and implementation of financial products and services for transnational households.

The paper proceeds as follows: Section 2 presents a conceptual framework of the remittance and information-sharing decisions. Section 3 provides details of the UAE-Philippines migration corridor. Sections 4 and 5 describe the experimental design and data, respectively. Section 6 presents the empirical strategy and results. Section 7 discusses other motivations for underreporting income, and Section 8 concludes.

2 Conceptual Framework: The Remittance & Information Sharing Decision

In this section, I present a conceptual framework of the remittance and information-sharing decisions that builds on the frameworks developed by *Joseph et al. (2018)* and *Seshan & Zubrickas (2017)* to incorporate opportunities for strategic misreporting on both sides of

lower.

⁶Field experiments have also been used to evaluate the impact of financial literacy and training programs targeted at transnational households to improve financial behaviors and decision-making. See *Seshan & Yang (2014)*, *Gibson et al. (2012)*, and *Doi et al. (2014)*.

the remittance relationship. Couples face a trade-off between the benefits of strategically misreporting income, to influence the remittance decision in their favor, and the costs of punishment if they are caught lying. Remittances are the result of an income-sharing contract—increasing in the migrant’s reported net income and decreasing in their spouse’s reported net income. Although some portion of each spouse’s income is common knowledge, migrants and their spouses have private information about their realized incomes which they report to each other. Each spouse can attempt to verify the other’s report and punish the other spouse if they are caught lying. This framework generates predictions that are distinct from existing remittance models and can be empirically observed.

2.1 The Remittance Contract

Consider a transnational household where the migrant in the host country earns net income $y_M > 0$, while their spouse in the home country earns net income y_S . Net income is income net of some specified subsistence expenditures and I refer to it as income from here on. Each spouse’s income is comprised of an observable component, y_o , which is common knowledge across spouses, and a hidden component, y_h , which is private information for each spouse. For migrants, while the terms of their contracts may be observable and common knowledge; their monthly working hours, bonuses, and consumption expenditure are private information. Similarly, some portion of the spouse’s income may also be unobservable to the migrant. Each spouse’s realized income $y_i = y_{o,i} + y_{h,i}$, where $i = M$ or S , is therefore private information.

The income-sharing contract specifies that the migrant will share part of their income with their spouse as remittances, while in return, the spouse staying behind will manage household and childcare responsibilities in the home country. This arrangement does not have to be an explicit contract and can instead be an implicit agreement or a social norm. Both the migrant and spouse send each other a report of their realized income \tilde{y}_i . The remittance amount r is a function of both of their reported incomes, $r(\tilde{y}_M, \tilde{y}_S)$. Remittances are increasing in the migrant’s reported income, as high-income migrants are able and expected to remit

more, and decreasing in the spouse's reported income, as high-income spouses have lower demand and need for remittances. Appendix A.I presents a model where this relationship is formally derived and shows that it exists for a range of income-sharing contracts with limited assumptions on the utility functions of migrants and spouses.

As remittances are based on reported information, migrants and spouses can attempt to verify each other's reports. Verification is imperfect and succeeds with probability $p_i(x_{i,-i}, c_i, \tilde{y}_i, y_i)$ that depends on migrant and spouse specific characteristics $x_{i,-i}$. Couples that monitor each other through regular communication about household finances have a greater probability of verifying each other's reports. Gender effects are also captured by these parameters. Successful verification also depends on the amount spent on verification c_i , and the magnitude of the misreporting $(\tilde{y}_i - y_i)$.⁷ If, upon verification, either spouse catches the other lying i.e. $\tilde{y}_i < y_i$, they can inflict punishment, denoted by $P_i(\tilde{y}_i, y_i)$. The punishment may take the form of social or familial sanctions. In addition, the migrant may punish the spouse by sending fewer remittances in the future than specified by the contract, while the spouse may punish the migrant by refusing to carry out the migrant's specified tasks and responsibilities.

The migrant's utility is increasing in their income and decreasing in the remittances they have to send, the probability of being caught lying, and the punishment for lying. The migrant faces a trade-off between the benefit of underreporting their income and having to send fewer remittances and the cost of punishment if they are caught lying. The spouse's utility, on the other hand, is increasing in their income and the remittances they receive while decreasing with the probability of being caught lying and the punishment for lying. The spouse faces a similar trade-off between the benefit of underreporting their income and receiving more remittances and the cost of punishment if they are caught lying. Migrants and spouses decide how much income to report to each other and how much to spend on verifying each other's reported income.

⁷An alternate but equivalent setup is that instead of increasing the probability of successful verification, these factors decrease the ability to keep the hidden portion of income private.

2.2 Empirical Predictions from the Framework

This framework generates predictions that are distinct from existing altruism and exchange-based remittance models (Lucas & Stark, 1985; Rapoport & Docquier, 2006; Yang, 2011).

First, spouses staying behind can directly influence remittances by strategically misreporting information to the migrant. Modeling remittances as a function of the spouse's reported income incorporates spousal demand for remittances in the framework (see Appendix A.I for details of such a model). This demand is an important feature of the remittance relationship and often a source of pressure on migrants. Migrant-sending households use remittances to insure against income shocks and therefore demand for remittances is directly impacted by changes in household income (Yang & Choi, 2007).

In existing exchange-based remittance models the effect of spousal income on remittances is ambiguous. These models limit the spouse's role to accepting or rejecting the terms of an agreement that specifies remittances as some function of only the migrant's income. In altruism-based remittances models, spouse's income negatively affects remittances. However, if remittances are purely altruistic there are no incentives on either side of the remittance relationship to hide income.⁸

Second, migrants can attempt to verify spousal reports at a cost. Migrants can spend significant resources to monitor their households (De Laat, 2014) and their limited ability to observe and control the household's decision-making is an important factor in the remittance decision (Ashraf *et al.*, 2015). Existing remittance models, however, limit the verification decision to the spouse (and limit misreporting to the migrant).

Third, the likelihood of successful verification of spousal reports depends on individual characteristics and the resources spent on monitoring. In standard remittance models, income verification is perfect and incurs a fixed cost. The only choice for migrants is whether

⁸Altruism-based models define the migrant's utility as a function of the household's consumption, which in turn is a function of the household's income. However, to allow for spouses to strategically influence the remittance decision requires the additional assumption that spouses are not altruistic and they know that the migrant is altruistic.

or not to incur the cost of verification.⁹ However, a couple’s ability to monitor each other varies based on characteristics such as the size of their networks and the frequency of communication.

Finally, the relevant parameter in the remittance decision is net income, implying that both income and expenses can be misreported to impact remittances. Although this specification is not unique to my framework (see [Seshan & Zubrickas \(2017\)](#), [Joseph *et al.* \(2018\)](#)), I highlight it here because the empirical research on misreporting has predominantly focused on income hiding. Overreporting expenses, which based on the conceptual framework has the same impact as income hiding, has not been analyzed before.

3 Context: Filipino Migrants in the UAE

In this section, I describe features of the UAE-Philippines temporary migration corridor that are important to studying communication among transnational households.

3.1 Immigrants in the UAE

The UAE provides the relevant host country institutional settings—a large remittance-sending migrant population, immigration policies that lead to the creation of transnational households, and a labor market that generates income fluctuations that migrants can strategically misreport. Some combination of these institutional settings exist in all countries that host temporary employment-based migrants.

The UAE is one of the largest temporary migration destinations and remittance sources in the world. Migrants make up 88 percent of the UAE’s 9.6 million population. The migrant population has increased substantially over the last decades, from 3.3 million in 2005 to an estimated 8.6 million in 2019 ([United Nations, 2019](#)). The remittances these migrants sent

⁹[Joseph *et al.* \(2018\)](#) modify the standard model by allowing for two types of income with their respective verification costs, thereby also allowing households to choose which income to verify.

amounted to 10.7 percent of the UAE’s GDP in 2018 and made it the second-largest source of outward remittances (World Bank, 2018a).

Almost all migration to the UAE is temporary and employment-based. The immigration policy, known as *kefala* or sponsorship, is widely practiced in the Middle East. Visas are tied to employment status with a specific employer and do not offer any paths to legal permanent residence or citizenship. Employment contracts are only two years long but can be repeatedly renewed with the consent of both parties. When a contract ends or is terminated, migrants must either obtain a new contract or return to their home country within 30 days.

The UAE’s immigration policies and high cost of living lead to the creation of transnational households. Immigration requirements based on income and occupation prevent low-income migrants from inviting their spouses and children to the UAE—creating transnational households. Male migrants must have a monthly income of at least 4,000 dirham (USD \$1,089) to invite their spouses and children, while female migrants face stricter requirements.¹⁰ Even when these income and employment conditions are not binding, the high cost of living in the UAE, relative to migrants’ home countries, also dissuades them from inviting their spouses and children. Female migrants are again disproportionately impacted by these factors. Husbands cannot work in the UAE based on their wives’ visa status and must acquire their own work visas. In contrast, wives of male migrants can work in the UAE based on their husbands’ visa status.

Migrants working in the UAE experience fluctuations in their monthly income despite specific contracts. These fluctuations create additional opportunities to strategically misreport income that would not be present if incomes remained stable over the full contract cycle. Employment contracts are required to state the employee’s remuneration. However, this is often only specified as the minimum required working hours and the corresponding total

¹⁰Female teachers, engineers, doctors, or other medical professionals have the same income requirements as men; however, women employed elsewhere are required to have a minimum monthly income of 10,000 dirham (USD \$2,722), and even then, each petition is decided on a case by case basis by the UAE immigration department. The income threshold for each category is reduced to 3,000 dirham (USD \$817) or 8,000 dirham (USD \$2,178), respectively, if the migrant’s accommodation is provided in-kind by their employer.

monthly wage. [Joseph *et al.* \(2018\)](#) use administrative payroll data to show that migrants in the UAE experience substantial fluctuations in monthly wages caused by variations in working hours and overtime pay. Anecdotal evidence from focus groups suggests that migrants also experience income fluctuations due to delayed or missed paychecks.

3.2 Emigrants from the Philippines

The Philippines has a large, gender-balanced emigrant population. The remittances they send are a key component of the country's development policy, and a significant proportion of Filipino households rely on these remittances to sustain themselves.

The Philippines has one of the largest emigrant populations in the world. In 2019, there were 2.2 million Filipino migrants (known locally as Overseas Filipino Workers or OFWs) worldwide. These migrants remitted USD \$32.8 billion in 2017, making the Philippines the third-largest remittance-receiving country in the world. According to the Filipino government's nationally-representative Family Income and Expenditure Survey of 2009, 26 percent of households received remittances from abroad. The UAE was the second-largest destination and source of remittances for Filipino migrants, accounting for 13.7 percent of the total Filipino migrant population and 13 percent of the total remittances to the Philippines in 2017 ([World Bank, 2018b](#)).

A key feature of Filipino migrants is their gender composition. Appendix Table [A.IV](#) shows the gender composition of Filipino migrants by destination. In 2019, 56 percent of Filipino migrants were women. In the UAE, the fraction of female Filipino migrants was even higher at 69 percent. The Middle East region, which includes the UAE and constitutes the majority of Filipino migrants, shows a similar trend. This is a much higher proportion of female migrants than most migrant-sending developing countries and allows the analysis of the interaction of gender with migration and remittance decisions. However, gender composition does vary across different locations. For instance, among major Filipino migrant destinations, Saudi Arabia demonstrates a higher proportion of male Filipino migrants (43.4%) compared

to the UAE. On the other hand, Kuwait has a notably higher percentage of female Filipino migrants (85.8%).

4 Experimental Design

The experiment is designed to address the main challenges of studying information sharing in transnational households—observing communication about the household’s actual finances among spouses spread across two countries. The experimental design is based on the simple idea that if couples strategically misreport information to each other, they will differentially report this information when it is observable to their spouse compared to when it is not observable. I implement this idea by separately surveying migrants and their spouses about their respective finances. In the survey, I experimentally vary if an individual’s responses are observable to their spouse and use this variation to identify the impact of spousal observability on information sharing.

4.1 Sample

The study sample is comprised of migrants working in the UAE and their spouses living in the Philippines. This transnational sample allows me to analyze information sharing from both sides of the remittance relationship.

The sample was drawn from a subject pool of participants from a separate study on the remittance behavior of migrants.¹¹ The subject pool consisted of migrant workers from the Philippines living and working in Dubai, UAE. Migrants were recruited between September and December 2018 via face-to-face intercepts in locations frequented by Filipino migrants in Dubai.¹² Migrants who expected to continue working in the UAE for the following 12

¹¹The subject pool was recruited as part of [De Arcangelis & Yang \(2019\)](#). Details of the subject pool recruitment are described in [Appendix A.II](#)

¹²The Filipino community in Dubai is highly concentrated in the Satwa and Rigga neighborhoods. Recruitment locations included metro stations, Filipino restaurants, retail stores, and remittance service provider branches in these neighborhoods.

months and agreed to participate were enrolled in the subject pool. At enrollment, migrants were administered a baseline survey that collected information on demographics, remittance behavior, and contact details of their remittance recipients. I use this baseline data to identify and invite my study sample and to analyze selection into the study and heterogeneity in treatment effects.

From this subject pool of Filipino migrants, I invited all married migrants, whose spouses were living in the Philippines and who had sent remittances to their spouse’s household in the last year, to participate in this study. Separately I also invited their spouses in the Philippines to participate. These criteria produced an invited sample of 492 couples (984 individuals, half in the UAE and half in the Philippines). Of these invited individuals, 159 migrants and 156 spouses participated in the study—a take-up rate of around 32% for both groups. This included 94 matched couples (both the migrant and their spouse participated), 65 cases where only the migrant participated, and 62 cases where only the spouse participated.

4.2 Experimental Conditions

The experimental conditions were designed to study information sharing of the transnational household’s actual finances.

Migrants and their spouses were invited to participate in a survey that was marketed as a research activity to improve information and awareness about the experience of Filipino migrant workers in the UAE and their migrant-sending households in the Philippines. In the survey, respondents were asked for information about their finances and employment, and their beliefs about their spouse’s finances; with the migrant reporting their information in the UAE and the spouse reporting theirs in the Philippines. Participants were informed that summary results of the data collected from the surveys would be shared with them when the study was completed.

The surveys were conducted over the phone, separately for both migrants and their spouses between January and April 2019. Participants were aware that their spouses would

also be separately invited to participate in the study. However, no details about their spouse’s survey activity including; when they would be contacted, their participation status, or the questions they would be asked, were shared with participants. Although the survey order was not randomized and migrant surveys started first, there was a significant overlap in the timing of migrant and spouse surveys. As a result, among matched couples, where both the migrant and spouse participated, the migrant was surveyed first in 60% of the couples. In the empirical analysis I control for the survey order and the duration between surveys of matched couples. Figure I shows the timeline of project activities along with the sample size at each stage.

To elicit the causal effect of spousal observability the experimental conditions varied whether an individual’s responses to the relevant survey sections were observable to their spouse. During the survey, participants were first asked to report their beliefs about their spouse’s finances. I use this information to document information asymmetry among spouses about each other’s finances. After this section, each participant’s treatment status was revealed to them. Participants in the treatment group were informed that the following survey section was designed as a joint activity with their spouses and that their responses in the following section would be shared with and observable to their spouses. In contrast, participants in the control group were informed that the following survey section was a separate activity for each spouse and that their responses would be kept private. The information was shared, based on the treatment status, after all surveys had been completed. Additional details of the experimental protocol including the treatment and control scripts read by surveyors to introduce the experimental survey section are described in Appendix A.III.

In the experimental survey section, migrants and spouses reported their average monthly income and expenses. To ensure respondents did not report the transnational household’s combined finances, migrants were specifically asked to report their income and expenses in the UAE while spouses were asked to report theirs in the Philippines. In addition, migrants

were asked to exclude any remittances they sent from their reported expenses, and spouses were asked to exclude any remittances they received from their reported income. Respondents had the option to report information in either dirhams or Philippine pesos. For the analysis, the responses have all been standardized to dirhams based on the exchange rate at the time of the survey to allow for comparisons.

Participants responded to the experimental survey section, which asked questions about their finances, knowing whether or not the information they were reporting would be shared with and observable to their spouses. Any difference in the information reported by the treatment and control groups is therefore the causal effect of spousal observability.¹³ The experimental design allows me to identify the impact of spousal observability using self-reported data without observing participants' true finances (or the difference between their self-reported and true finances). Identification is driven by the *difference* in self-reported information when it is observable and not observable to the spouse.

Random assignment was done at the couple level using the baseline survey data and was not stratified by any pretreatment characteristics.¹⁴ Half of the invited participants were randomly assigned to the treatment group. Treatment status was assigned to all invited participants before they were contacted. Each participant was administered a treatment status-specific survey. Participants were not informed that there were multiple treatment conditions, that treatment was assigned at the couple level, or the treatment status of their spouse.

The participants were free to regularly communicate with their spouses outside the survey during this time. In pilot surveys conducted before this study, almost all transnational couples reported communicating with each other daily through instant messages or phone calls. Outside communication may impact selection into the study by one spouse preventing

¹³For the treatment condition to be effective, respondents in the treatment group must believe that the information they report will indeed be shared. The treatment becomes more salient when the information sharing condition is more credible.

¹⁴Treatment assignment was done at the couple level to avoid any household conflict from spouses being assigned different treatment statuses.

or discouraging the other from participating. I check for and do not find evidence of such selection in Section 5.2. In terms of the treatment effect, outside communication may diminish the impact of spousal observability as couples have the option to explain any discrepancies in reported information outside the survey, attenuating my treatment effect estimates. For matched couples, where both the migrant and the spouse staying behind participate in the survey, outside communication may increase the salience of spousal observability if spouses share their participation status with each other. This may amplify any strategic behavior. Alternately the spouse surveyed second may be better prepared for the survey regardless of treatment status. To check for such responses, in the empirical analysis I separately analyze the reporting behavior of the subset of matched couples in my sample.

5 Data

5.1 Descriptive Statistics

Table I shows summary statistics from the migrant baseline surveys for all invited migrants, participating migrants, and participating migrants by their treatment status. By design, all migrants in the sample are married. They are, on average, 37 years old and have two children. Men make up the majority of the invited migrant sample, accounting for 69 percent. Although less than a third of the sample is female, the proportion of women among Filipino migrants in the UAE is substantially higher than the proportion of women among migrants from other countries.¹⁵

Migrants whose spouses are in the Philippines generally have low incomes because of the income and employment requirements for family immigration described in Section 3.1. A majority of the sample earned between 1,500 dirham (USD \$408) and 4,500 dirham (USD \$1,225) per month. (The income threshold for family immigration for male migrants and

¹⁵Other migrants, primarily from South Asia, are predominantly male. As a result, UAE had the highest gender imbalance in the world in 2015, with a male/female ratio of 2.2

some female migrants is 4,000 dirham (USD \$1,088) and 10,000 dirham (USD \$2,722), respectively.) Migrants are primarily employed in the services, sales, and construction sectors. In terms of remittance behavior, all migrants have sent remittances to their spouses in the past year. Ninety percent of migrants send remittances to their households every month, and in almost all cases, their spouse is their primary remittance recipient. The average monthly remittance is around 1,555 dirhams (USD \$423) which corresponds to 40 percent of the migrant's monthly income.¹⁶ This matches findings in other studies that show that migrants with transnational households send a significant portion of their incomes as remittances. Migrants also report sending remittances to, on average, one other recipient over the last year. Other recipients include parents, siblings, in-laws, and other relatives.

Migrants are generally well settled in the UAE having lived there for an average of seven years. As employment contracts are two years long, the average stay of seven years implies that migrants stay for multiple contract cycles, either renewing with the same employer or switching employers. Contracts often include in-kind benefits such as food, housing, and annual flight tickets for migrants to visit their households. Most migrants visit their household in the Philippines once every year and the average duration since their last visit at the time of the survey was around two years.

To understand the level of communication and control over the household's finances at baseline, migrants were asked about their financial decision-making. Migrants report discussing household budgets with their spouses on average once per month. Around half of migrants report instructing their spouses on how to spend remittances, while 43 percent say they would like more control over how their spouse spends remittances.

¹⁶Based on the average income reported by the control group in the experimental survey. In the baseline survey migrants only reported their income range.

5.2 Selection and Balance

I test for selection into the study and selection into treatment to address concerns about the external and internal validity of the experiment. I do not find evidence of either type of selection based on observables and I discuss below how selection on unobservables may impact my treatment effect estimates.

Individuals who hide or misreport information to their spouses may be less likely to participate in the study regardless of their treatment status. Participation involves reporting information to a research team that will also be in contact with their spouses. This may be enough of a deterrent from participating for anyone actively seeking to hide information from their spouse, causing me to underestimate the impact of spousal observability. Alternately, individuals who are seeking information about their spouse's finances may participate in the study to access more information. Selection on this margin, however, is not associated with a participant's own misreporting and would not bias my estimated treatment effect. Although if these individuals are also more misinformed about their spouse's finances, I may overestimate information asymmetry at baseline.

I check for selection into the study using the migrant baseline data by comparing all migrants who were invited to participate in the study to those who participated. Columns (1) and (2) of Table I show the means for the invited migrant sample and those who agreed to participate. Column (3) shows the p-value from the two-sided t-test of the equivalence of means of those who did and did not participate. I find no evidence of selection into the study based on observable remittance behavior or measures of communication and control over the household's finances. The only statistically significant difference is that participants were less likely to be male than non-participants and I control for this in my regression specifications.

Selection may also be based on treatment status. Individuals who want to hide information may be less likely to participate if they are assigned to the treatment group where survey responses would be shared with their spouse, again causing me to underestimate the impact of spousal observability. As the treatment status was assigned before contacting

respondents, I test for and find no evidence of selection into the study based on treatment assignment. Columns (4) and (5) of Table I show group means by treatment status and column (6) shows the p-value from the two-sided t-test of the equivalence of these means. Although I do not have baseline data for spouses, as a proxy, I use the migrant baseline to test for selection among migrants whose spouses participated in the study. The results are shown in Appendix Table A.I which replicates Table I for the sample of migrants whose spouses participated. I again do not find evidence of selection into the study or treatment.

While I do not find evidence of selection into the study from the subject pool, external validity may still be a concern as the subject pool, which is limited to Filipino migrants, may not fully represent the broader population of transnational households. My sample is similar to the overall migrant population in the UAE in terms of occupation. According to the 2019 UAE Labor Force Survey, around 14.4% of migrants work in elementary jobs like construction and manual labor, 15.5% work in sales, and around 12% work in administrative or management positions. However, only 26% of overall migrants in the UAE are women, whereas among Filipino migrants in general and in my sample, the share of women is higher (38%). Therefore, caution should be exercised when generalizing these results to transnational households in other host-home country pairs that have different demographic characteristics.

6 Empirical Analysis and Results

Using a combination of descriptive and experimental results, I show that there is significant information asymmetry between migrants and their spouses staying behind, and their reporting behavior under spousal observability is consistent with a theory of strategic misreporting. Spouses staying behind and certain subgroups of migrants underreport their income when it is observable to their spouse. Among both migrants and their spouses staying behind, women are more likely to underreport income. The majority of spouses staying behind are

women, and they play the main role in driving the underreporting of income by spouses. Information asymmetry and income underreporting are greater when information is more difficult to observe and less likely to be verified. Spouses underreport income on the intensive margin by underreporting known sources of income instead of reporting zero income which would be easier for migrants to catch. Income is only underreported when migrants do not demand control over or regularly communicate about the household's finances, making them less likely to verify reported information. Together these results are consistent with the theory and this reporting behavior represents strategic misreporting to influence the remittance decision and contributes to the information asymmetry between migrants and their spouses staying behind.

6.1 Descriptive Analysis

6.1.1 Remittances and Net Income

First, I show that remittances are increasing in the migrant's net income and decreasing in the spouse's net income, creating incentives for misreporting net income on both sides of the remittance relationship and validating a key feature of the conceptual framework presented in Section 2.

Figure II shows scatter plots and the accompanying linear regression lines for monthly remittances plotted against the migrant's and spouse's reported net income. Remittances are reported in the migrant baseline survey, while the net income for each spouse is the difference between their reported monthly income and expenses in the experimental survey. The figures are drawn using data from only the control group, as income and expenses reported by the treatment group are affected by the treatment condition.

Panel A shows that remittances are positively correlated with migrants' net income. The linear regression line has a slope of 0.4, implying that migrants remit 40 percent of their reported net income and by underreporting net income they can decrease the amount of re-

mittances they have to send. Panel B shows that remittances are negatively correlated with spouses' net income. The slope of the regression line is -0.5, implying that for each additional dirham of reported spousal net income, remittances decrease by 0.50 dirham. By underreporting net income spouses can increase the remittances they receive from migrants. Panel B also shows that a majority of spouses have negative net income. Their income, excluding any remittances they receive, is less than their expenses; highlighting that remittances are essential for these spouses to sustain their households in the Philippines.

6.1.2 Information Asymmetry

Next, I document the extent of information asymmetry between migrants and spouses. Prior work has primarily focused on the information asymmetry of migrant income among migrant-sending households (Baseler, (forthcoming); Seshan & Zubrickas, 2017; Joseph *et al.*, 2018). However, as the conceptual framework showed, both migrants and spouses have incentives to strategically misreport information to each other. In addition, the relevant parameter for the remittance decision is reported income net of expenses. Overstating expenses theoretically has the same impact as hiding income and is therefore also a plausible margin for strategic misreporting. By focusing only on income we may underestimate the true scope of information asymmetry in the transnational household. I expand on the literature by documenting information asymmetry; first, across multiple margins, and second, on both sides of the remittance relationship. I find that both migrants and spouses have biased beliefs about each other's finances. Migrants underestimate spouses' income and overestimate spouses' expenses, whereas spouses underestimate migrants' in-kind employment benefits.

In the experimental survey, in addition to reporting their own finances, migrants and spouses reported their beliefs about each other's finances. To measure information asymmetry, the comparison of each spouse's reported finances with the other's beliefs is visually shown in Figure III and statistically analyzed in Table II. Again, the comparison is made

using data from only the control group.¹⁷

Panel A of Figure III shows the spouse's beliefs about the migrant's finances. Spouses underestimate migrant's income by 16 percent (630 dirham or USD \$172) and overestimate migrant's expenses by 15 percent (183 dirham or USD \$50). Although these differences are large, because of significant variation in these measures they are not statistically significant. Migrants and spouses were also asked to report if migrants receive non-wage benefits. These benefits are a common and sizable component of migrant remuneration in the UAE, however, compared to wage income they are more difficult for spouses to observe. Panel A.II shows that spouses are not aware that migrants receive in-kind food, housing, transport, and health care benefits, and these differences are all statistically significant (see Table II for comparison of means).

Panel B of Figure III shows information asymmetry among migrants about their spouse's finances. Despite the literature's focus on biased beliefs among migrant-sending households, I find strong evidence of biased beliefs among migrants. Migrants underestimate their spouse's income and overestimate their spouse's expenses by 29.5 and 22.3 percent respectively. Despite similar patterns to panel A, these differences are larger and also statistically significant in both cases, highlighting that information asymmetry is greater among migrants. Panel B also shows that on average spouses' incomes, excluding any remittances they receive, are less than their expenses. Migrants are aware of and overestimate this gap in spouses' net income.

These results show the importance of analyzing information asymmetry across multiple margins from both sides of the remittance relationship. They also raise the question, why do migrants and spouses have biased beliefs about each other's finances? The directions of the bias (underestimating income and overestimating expenses) support the claim that these biases are caused by strategic behavior to influence the remittance decision. However, this evidence is only suggestive. Biased beliefs may exist for many reasons including a lack

¹⁷Beliefs were elicited before the treatment assignment was revealed and are therefore not affected by treatment status.

of communication or interest in financial issues. Money and finances are difficult topics to discuss for any household so biases may persist due to communication frictions without any strategic motivations. To understand if these biased beliefs are related to information sharing behavior I now analyze the results of the spousal observability experiment.

6.2 Experimental Analysis & Results

6.2.1 Specifications

To identify the impact of spousal observability I estimate the following OLS regressions in the experimental results that follow:

$$(1) \quad Y_i = \alpha + \beta T_i + \gamma X_i + \epsilon_i$$

Y_i is the outcome of interest, either reported income or expenses. In the main specification, both outcomes are measured as average monthly amounts in dirhams. T_i is the treatment status indicator, X_i is a vector of controls and ϵ_i is the error term adjusted for heteroskedasticity. The coefficient β is the average difference between the outcome when an individual's response is observable and not observable to their spouse. I run regressions, separately for migrants and spouses to allow for heterogeneous responses to treatment, both without and with controls to improve the precision of my treatment estimates. I also report randomization inference p-values for the treatment estimates from 5,000 replications of the treatment assignment. Controls from the migrant baseline survey include demographic characteristics, baseline income-category dummies, and measures of monitoring and remittance behavior. In addition I include controls for the order and timing of surveys.

To analyze treatment effect heterogeneity I modify the main specification as follows:

$$(2) \quad Y_i = \alpha + \beta T_i + \lambda(T_i \times x_i) + \gamma X_i + \epsilon_i$$

$T_i \times x_i$ is the interaction between the treatment status and trait x_i . The coefficient β is now the average treatment effect for individuals that do not have trait x , λ is the difference between the average treatment effect of individuals that have and do not have trait x , and the sum of β and λ is the average treatment effect for individuals with trait x . I run regressions separately for migrants and spouses for each trait x . All regressions include the vector of controls X from the main specification which always includes the direct effect of trait x .

6.2.2 Main Results

Spouses staying behind underreport income when it is observable to the migrant. Income is underreported on the intensive margin by underreporting known sources of income and underreporting is greater when the migrant also participates in the study. Together these results are consistent with a theory of strategic underreporting of income driven by spousal observability. I do not find evidence of differences in income reporting by migrants. Neither migrants nor spouses staying behind differentially report expenses under spousal observability.

Table III shows the treatment effect of migrant observability on their spouse's reported monthly income and expenses. Columns (1) and (2) show the results for reported income without and with controls, respectively. Spouses in the treatment group underreport their income by 213 dirham (USD \$58) which represents a 31 percent decrease from the control group's average income of 685 dirham (USD \$186). The magnitude of the treatment effect almost exactly matches the magnitude of the migrants' bias in their belief about spouses' income (migrants underestimate spouses' income by 200 dirham or USD \$54), supporting the claim that the information asymmetry is driven by reporting behavior. In terms of the remittance relationship, this underreporting of income is associated with a 107 dirham (USD \$29) or a 7 percent increase in monthly remittances, based on the relationship between the spouse's reported net income and remittances shown in Section 6.1.1.

Columns (3) and (4) show the results for reported expenses, without and with controls,

respectively. I do not find evidence that spouses staying behind differentially report their expenses under migrant observability. This is not surprising because for both migrants and spouses, despite being a plausible margin for underreporting net income, overreporting expenses is likely to invite greater scrutiny and verification from the other spouse. Neither migrants nor spouses want to reward each other for greater spending. As a result of this moral hazard, reported expenses are more likely to be verified and any misreporting of expenses is more likely to be caught. Expenses are therefore not the preferred margin for misreporting net income.

From the migrant’s side, I do not find evidence that migrants, on average, differentially report income or expenses when they are observable to their spouse. Table IV shows that migrants in the control group reported an average monthly income of 3,809 dirham (USD \$1,037) and expenses of 1,201 dirham (USD \$327). Compared to spouses the treatment coefficients are both smaller in magnitude (around 6 percent of the control mean for both reported income and expenses) and not statistically significant. These results persist after controlling for migrant baseline characteristics in columns (2) and (4).

The migrant results match the descriptive findings that spouses staying behind had better information about the migrant’s finances. Spouse’s beliefs were not statistically different from the migrant’s reported income and expenses, providing suggestive evidence that migrants were either not misreporting information on these margins, or any misreporting was limited in magnitude. In addition Section 6.3.2 shows that the lack of misreporting on average may be driven by the low-income nature of this sample and that certain subgroups of migrants do underreport their income.

To further analyze the relationship between differential reporting and spousal observability I leverage the variation in migrant and spousal participation in the study. My sample includes migrants whose spouses staying behind did not participate, spouses staying behind whose migrants did not participate, and matched couples, where both the migrant and their spouse staying behind participated. Among matched couples, outside communication may

impact reporting behavior. While I do not inform individuals about their spouses' participation or treatment status, they may share this information directly. If an individual knows that their spouse has participated in the study and is then informed of their treatment status, the information sharing condition may be more credible and salient for them. This may amplify any impact of spousal observability compared to cases where only the migrant or spouse participated. Outside communication may also impact reporting behavior for matched couples in other ways. For instance, respondents surveyed second may be better prepared for the survey regardless of treatment status.

To analyze these dynamics, I re-estimate the treatment effects, restricting the sample to matched couples. Among these couples, the migrant was surveyed second 40 percent of the time while in the remaining cases the spouse staying behind was surveyed second. I use this variation in timing to control for any order effects in reporting behavior. In addition, I also control for the duration between migrant and spouse surveys to account for the increased likelihood of outside communication as the duration between surveys lengthens.

The results for spouses staying behind using the sample of matched couples are shown in Table V. Spouses underreport slightly more income when the migrant is also participating in the study. The treatment effect on reported income is larger in this subsample—310 dirhams (USD \$84) compared to 213 dirhams (USD \$58) for the full sample and it persists after controlling for the order and timing of surveys. These results show that differential reporting is of a similar magnitude for this subsample despite the additional dynamics of outside communication on reporting behavior. For expenses, I again do not find any evidence of differential reporting by spouses. Table VI shows matched couple results for migrants. The estimates are similar to the results for the full sample shown in Table IV and I again do not find evidence of differential reporting of income or expense by migrants.

Spouses can underreport income at the intensive margin, by reporting positive income from a source known to the migrant but underreporting it, or at the extensive margin, by reporting zero income and hiding income sources altogether. Based on the conceptual

framework, income is less likely to be hidden when it is easier to verify. Verifying the existence of an income source is easier than verifying the amount of income earned from a known source. Income hiding at the extensive margin is, therefore, more likely to be caught because peers and other family members can also observe and verify the spouse's income sources for the migrant. In contrast, income hiding at the intensive margin is difficult to verify, even for other family members.

I test for and find that income underreporting is driven by the intensive margin in Figure IV and Table VII. Figure IV shows the cumulative distribution of reported income, separately for migrants and spouses by treatment group. Panel A shows that in both the treatment and control groups about a third of spouses staying behind report zero income i.e. the remittances they receive are their only reported income source. Spouses do not underreport income at the extensive margin by differentially reporting zero income when it is observable to the migrant. The figure also shows that the distribution of spouses' reported incomes when it is observable to the migrant is always lower than the distribution when it is not observable to the migrant; i.e., the distribution when the response is observable stochastically dominates the distribution when the response is not observable. Table VII presents an alternate specification, replicating the spouse's results from the main specification in Table III with the outcome variable measured as the log of reported monthly income in dirhams. This specification drops spouses that report zero income, focusing exclusively on differential reporting on the intensive margin. The results remain similar to Table III. Spouses underreport their income by 46 log points when it is observable to the migrant, showing that underreporting is driven primarily by the intensive margin of underreporting known sources of income which is harder for migrants to verify.¹⁸

¹⁸Appendix Table A.II shows the results for the log of migrant's reported monthly income and finds results similar to the main results in Table IV. The results for the log of migrant's income and log of both migrant's and spouse's expenses are less informative because they are never zero.

6.2.3 Gender

Gender is an essential component of any analysis of household decision-making. However, the main challenge in analyzing the role of gender in transnational households has been the lack of gender balance among migrants (and spouses) in most settings. This makes it difficult to disentangle the impact of the role of each spouse in the transnational household as either the remittance sender or recipient, from their gender. In my sample, a third of migrants and two-thirds of spouses staying behind are women, allowing me to analyze the interaction of gender with reporting behavior for both migrants and their spouses.

I estimate treatment effect heterogeneity by gender and find large difference in income underreporting between men and women. Among both migrants and spouses staying behind, only women underreport their income when it is observable to their husbands, whereas for men the treatment effect of spousal observability is not statistically different from zero. The results are shown in Table VIII. The variable *male* identifies male spouses staying behind and male migrants, in their respective regressions. Wives staying behind underreport their income by 321 dirham (USD \$88) when it is observable to the migrant. This represents around 47 percent decrease from both the average reported income of the overall control group of 685 dirham (USD \$186) and of women in the control group of 675 dirham (USD \$183). Female migrants underreport their income by 572 dirham (USD \$157) when it is observable to their husbands staying behind. This represents a 15 percent decrease from the average reported income of the overall control group of 3,809 dirham (USD \$1,037) and a 17 percent decrease from the average reported income of women in the control group of 3,361 dirham (USD \$915).

To understand these gender differences in income underreporting, I use the migrant baseline data to further analyze gender differences in demographics, measures of communication and control over the household's finances, and remittance behavior. The results are shown in Table XI. I find that male migrants earn higher incomes and send higher remittances than female migrants. These differences stem from differences in employment—male migrants are

more likely to be employed in the food-service and construction sectors and less likely to be employed in the personal service sector. However, these differences are unlikely to be the cause of the lack of income underreporting by men. Higher incomes are more likely to be associated with more income hiding because low-income migrants have limited ability to send remittances and therefore limited incentives to hide their income (see Section 6.3.2 for more details). In addition, the findings of differential reporting behavior by gender among both migrants and spouses staying behind suggest that these differences are not driven by factors that are specific to an individual's role in the transnational household as remittance sender or recipient and are instead broader.

Lack of income underreporting by husbands may instead be driven by gender norms about household income and financial management. Filipino women are more likely to be the financial managers of the household, regardless of their income or occupation status, and are therefore more likely to want control of their husband's finances. Ashraf (2009) documents this norm for co-residing Filipino households and Table XI shows this norm persists for transnational Filipino households. Among migrants, women are more likely to instruct their spouses on remittance spending and more likely to want more control over the household's finances. As shown in Section 6.3.1, these traits limit underreporting by the other spouse, therefore women may be better able to limit income underreporting by men.

6.3 Heterogeneity & Mechanisms: Is Underreporting Income Hiding?

Does the underreporting of income due to spousal observability represent income hiding? To answer this question, I analyze treatment effect heterogeneity by characteristics associated with greater costs and benefits from hiding income. Based on the conceptual framework presented in Section 2, strategic misreporting is motivated by the remittance benefits of hiding income and constrained by the likelihood and punishment of being caught. It is

therefore instructive to examine whether underreporting of income varies by remittance behavior and measures associated with an increased ability of couples to verify each other's reported income. In line with the theory that underreporting represents income-hiding, I find that spouses only underreport income when migrants do not demand control over or regularly communicate about the household's finances. This makes migrants less likely to verify information reported by their spouses and decreases the likelihood of income-hiding being caught. In terms of remittance behavior, only migrants who send a significant proportion of their income as remittances underreport income to their spouses. This result suggests that migrants only underreport income when they are expected to share income with their spouses, further indicating that the underreporting of income is strategic.

While the empirical results are consistent with income-hiding, since I do not observe true income, under certain assumptions on reporting behavior alternate explanations are also plausible. Specifically, if respondents in the control group overreport income while respondents in the treatment group report truthfully, I would still observe income underreporting under spousal observability. Such reporting behavior may be caused by a social desirability effect where respondents perceive some benefit of overreporting their income to surveyors but spousal observability induces them to truthfully report their income instead. This explanation however is unconvincing. The heterogeneity results mentioned above do not support this claim. There is no reason to think that a social desirability effect would be associated with remittance behavior or measures of financial communication and control, whereas the conceptual framework clearly shows the link between these characteristics and income-hiding.

Another potential explanation for the control group systematically overreporting their income is if their reports are imprecise in a way that they are upward biased. Spousal observability may then increase the precision of reported information and the observed treatment effect would represent more precise income responses and not income-hiding. However, it's possible that rather than overreporting income, the control group underreports it. Respon-

dents in the control group may underreport income if they are weary of scams or their security or if they perceive their income responses are for some means-tested development intervention (the surveyors identified themselves from Innovations for Poverty Action). Although in my setting the potential bias in the control groups reporting cannot be empirically tested, if the income reports are on average unbiased, or downward biased, then given the combination of the information asymmetry and heterogeneity results, income-hiding is the most likely explanation of the treatment effect.

The heterogeneity results by communication and remittance behavior are shown in Table IX for spouses and Table X for migrants. Each column is a separate regression, reporting the coefficient of the treatment indicator, the interaction of the treatment indicator with each trait, and the sum of the treatment and interaction coefficients. To allow comparisons, the first columns reproduce the main income results for spouses and migrants from column (2) in Tables III and IV respectively. I again report heteroskedasticity-robust standard errors and randomization inference p-values.

6.3.1 Communication and control over finances

First I use three measures of the migrant’s financial communication and control to analyze the impact of increased verification on income underreporting.

A growing literature highlights that because of differences in the spending preferences of migrants and their spouses, migrants send fewer remittances when they cannot control how those remittances are spent (Ashraf *et al.*, 2015; Yang, 2011; Chin *et al.*, 2015). I test whether migrants wanting more control over remittance spending impacts reporting behavior by migrants and spouses. The trait *control* is a dummy equal to one if at baseline the migrant reports wanting more control over how remittances are spent by their spouse.

Column (2) of Table IX shows that income underreporting by spouses is entirely driven by spouses of migrants who do not demand more control over remittance spending. These spouses underreport their income by 569 dirham (USD \$155) when it is observable to the

migrant. On the other hand, spouses of migrants who demand control over remittance spending, do not underreport income when it is observable to the migrant. Migrants who want more control over remittance spending may communicate this demand to their spouses, alerting them to increased scrutiny from the migrant over the household's finances. This scrutiny would increase the likelihood of the migrant catching any misreporting, deterring spouses from hiding income. In contrast, spouses of migrants who do not report wanting more control and therefore do not face increased scrutiny, are more likely to hide income. For migrants, column (2) of Table X shows that wanting more control over remittance spending is not associated with greater income underreporting.

I now move from analyzing cases where migrants *want* more financial control to cases where they *exercise* more financial control. The most basic form of financial control that migrants can exercise is communicating about the household's finances with their spouses—asking and instructing spouses about where money is coming from and where it should be spent. In columns (3) and (4) of Tables IX and X, I test whether increased communication about household finances impacts income reporting by both spouses and migrants. *Instruct* and *budget* are dummies equal to one if at baseline the migrant reports instructing their spouse on how to use remittances and if the migrant discusses the household budget with their spouse more frequently than the median number of times (once every two months), respectively.

Table IX shows that increased instruction and communication about finances from the migrant limits underreporting by spouses. The likelihood of the spouse's misreporting being caught is higher when the migrant regularly communicates about the household's finances. Income underreporting is entirely driven by spouses of migrants who do not exercise these traits. Spouses of migrants who do not instruct their spouses on remittance spending and less frequently discuss the household budget, underreport their income by 566 dirham (USD \$154) and 597 dirham (USD \$163) respectively. Underreporting income is only a beneficial strategy, as I find, when the migrant does not exercise control through communication. For

migrants both measures are associated with lower underreporting, suggesting that increased communication also deters the migrant from underreporting income. However, given the large variation in migrant’s reported income, these effects are not statistically significant.

These three measures of communication and control are highly correlated with each other and proxy for the household’s underlying relationship dynamics. Couples who have shared financial goals and actively communicate about and jointly make financial decisions are less likely to resort to income hiding to achieve their goals. These are important findings because they show that differential income reporting is limited to certain subgroups of transnational households, that can be identified by observable baseline characteristics. This can improve the targeting and effectiveness of financial products and services for transnational households that leverage information sharing and control to impact financial decision-making.

6.3.2 Remittance Behavior

Based on the conceptual framework presented in Section 2, income is primarily hidden to impact the remittance relationship, to either avoid or induce more remittances. I use two measures of remittance behavior to analyze its interaction with reporting behavior; *amount* is the average monthly remittances in dirham that migrants report sending to their spouses at baseline and *median* is an indicator equal to one if migrants report sending greater than the median monthly remittance amount of 1450 dirham (USD \$395). The results for spouses and migrants are shown in columns (5) and (6) of Tables IX and X.

Both measures show that migrants that send higher levels of remittances underreport their income when it is observable to their spouses. For each additional dirham remitted, income is underreported by 0.77 dirham, and migrants who send higher than the median remittance underreport their income by 1,295 dirham (USD \$353). This represents 34 percent of the income of the overall control group and 23 percent of the income of high remittance senders in the control group. For spouses, I find some evidence that those who receive lower levels of remittances underreport their income.

Higher remittance levels show that an active remittance relationship exists between migrants and their spouses. These migrants are expected to share any reported income with the spouse staying behind. By underreporting income migrants can avoid sharing it. Migrants who are not expected to share their income do not have this incentive to underreport it. The positive relationship between remittances and underreporting income may also be driven by an income effect. Higher remittances are associated with higher levels of income. At these income levels, migrants may be able to send a base level of remittances while still hiding the remaining income.¹⁹ As my sample of migrants is primarily low-income this may also explain why I do not find evidence of migrants, on average, underreporting income.

7 Other Motivations and Implications for Welfare

The impact of income hiding on overall household welfare depends on spousal preferences and how hidden income is used and would have been used if it was not hidden. Without more information and assumptions about preferences and the counter-factual, the overall impact of underreporting income on welfare cannot be determined. Even so, the results are still informative to policy discussions on information asymmetry and migration. Firstly, I show that information asymmetry may be caused by misreporting. Therefore, if reducing information asymmetry is a policy objective simply increasing spousal communication may not achieve this because misreporting may persist. Secondly, reducing information asymmetry may reduce remittance flows. The conceptual framework implies that if information asymmetry is reduced through a reduction in income hiding by spouses, remittances would also decrease. Policymakers have focused on interventions that facilitate greater remittances and reduce information asymmetries based on the positive impacts on a variety of measures

¹⁹This matches [Seshan & Zubrickas \(2017\)](#) finding that information asymmetry of migrant's income among spouses, increases with the migrant's income.

of well-being associated with each of these two outcomes (Yang, 2011). However, my results show that these two outcomes may be inconsistent with each other. In such settings, the welfare impacts of information asymmetry reducing or remittance increasing interventions are a priori ambiguous.

While the empirical evidence and conceptual framework are consistent with a theory that strategic misreporting is intended to influence remittance levels, misreporting may instead be intended to influence other aspects of the remittance relationship. Spouses may hide income if migrants view their participation in the labor force negatively. If based on the remittance contract, the spouse staying back takes on household and childcare responsibilities, higher reported incomes may signal to the migrant that spouses are not allocating enough time and effort to these tasks. Similarly, migrants may hide income but not reduce remittances to signal their altruism in sending a greater proportion of their income as remittances. Alternately, migrants may hide income to avoid sharing it with other household members. If spouses share the remittances they receive with other households or family members, migrants may hide income to avoid such sharing. In each of these cases, the income-hiding is still primarily motivated by some aspect of the remittance contract.

Although the experimental design identifies differential reporting under spousal observability, this may be an underestimate of strategic reporting behavior defined more broadly. Misreporting information is one of a range of actions that can be used to hide information from spouses. Instead of purposefully misreporting information individuals may avoid discussing financial matters or give incomplete information to their spouses. This passive misreporting, however, is no longer an option for individuals in the treatment group as their reported information will be shared with and observable to their spouses. They must either commit to hiding information and purposefully misreport it or report the truth. If spousal observability induces these passive misreporters to tell the truth, their prior misreporting will not be captured in the treatment effect. This passive misreporting may also explain why despite biased beliefs about expenses, I do not find evidence that migrants or spouses

differentially report them under spousal observability.

8 Conclusion

This paper studies spousal communication in transnational households by eliciting the causal effect of spousal observability on reported information to analyze if spouses strategically misreport information to each other. Research on information asymmetry between migrants and their households has primarily focused on income hiding by migrants and its impact on remittances and the perceived returns to migration. This is the first study that looks at information sharing on both sides of the remittance relationship, across multiple margins of the household's actual finances.

I find that both migrants and their spouses staying behind have biased beliefs about each other's finances. Spouses staying behind and certain subgroups of migrants underreport their income when it is observable to each other. Among both migrants and their spouses staying behind, women are more likely to underreport income. Underreporting is greater when information is more difficult to observe and less likely to be verified. These reporting patterns are consistent with the theory that spouses staying behind strategically underreport their income to influence the remittance decision and this contributes to information asymmetry between migrants and their spouses. This theory helps explain why information asymmetry persists despite regular communication within transnational households. In focus groups conducted before this study, almost all transnational couples reported communicating with each other daily through instant messages or phone calls. However, the results suggest that these couples may not be explicitly or truthfully discussing their finances, particularly their incomes. Biased beliefs and the ability to strategically misreport information persist despite these significant improvements in communication technology. If reducing information asymmetry is a policy objective, interventions that only increase communication between spouses would not be able to address strategic reporting behavior. Addressing purposeful misreport-

ing requires interventions that increase spouses' abilities to monitor and control each other's financial decision-making, including interventions that specifically increase communication about finances.

It is important to acknowledge the limitations of this study's findings due to external validity and power concerns. Firstly, the sample is drawn from a subject pool of Filipinos in the UAE which may not fully represent the broader population of transnational households. Research on transnational households has primarily focused on select populations, examining specific host and home countries. Consequently, obtaining comprehensive descriptive statistics for the overall transnational population becomes challenging. Although I do not find evidence of selection into the study from the subject pool based on observable migrant characteristics, unobservable characteristics and spousal baseline characteristics may introduce selection biases. Additionally, the study's lower-than-expected participation rate led to it being underpowered based on initial calculations. Although the magnitude of my main results is similar to other studies in the literature, the sample size may have limited my ability to detect certain effects or relationships accurately. These caveats highlight the need for further research with larger, diverse samples and comprehensive data to strengthen the broader applicability of the findings.

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Figures and Tables

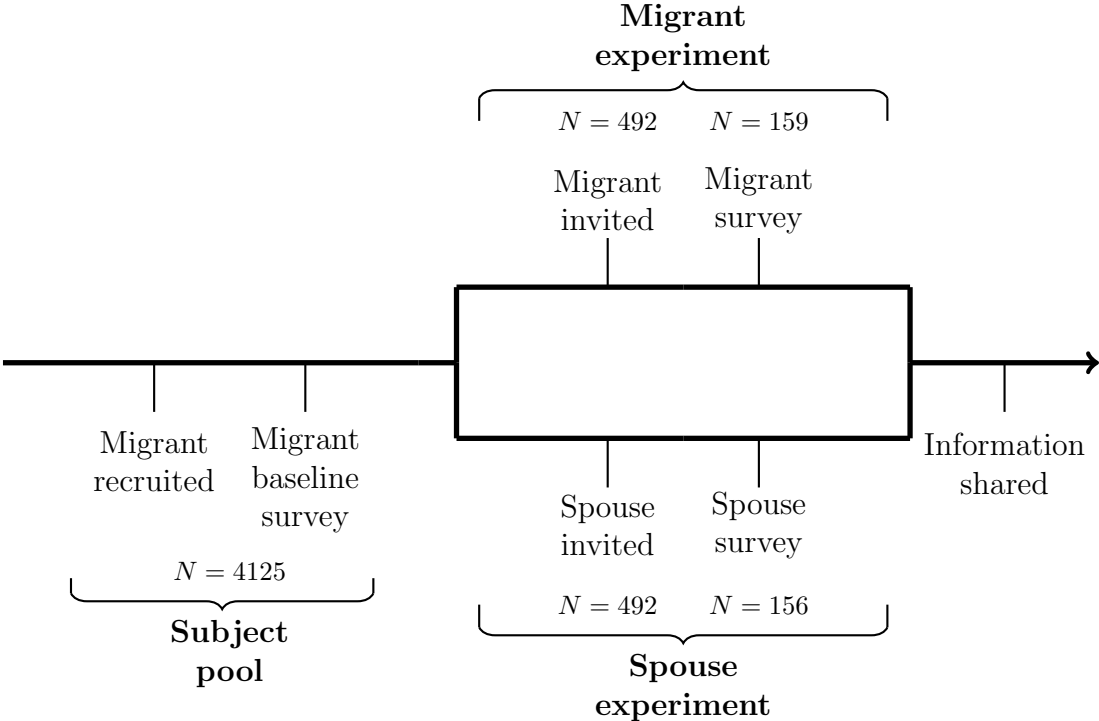
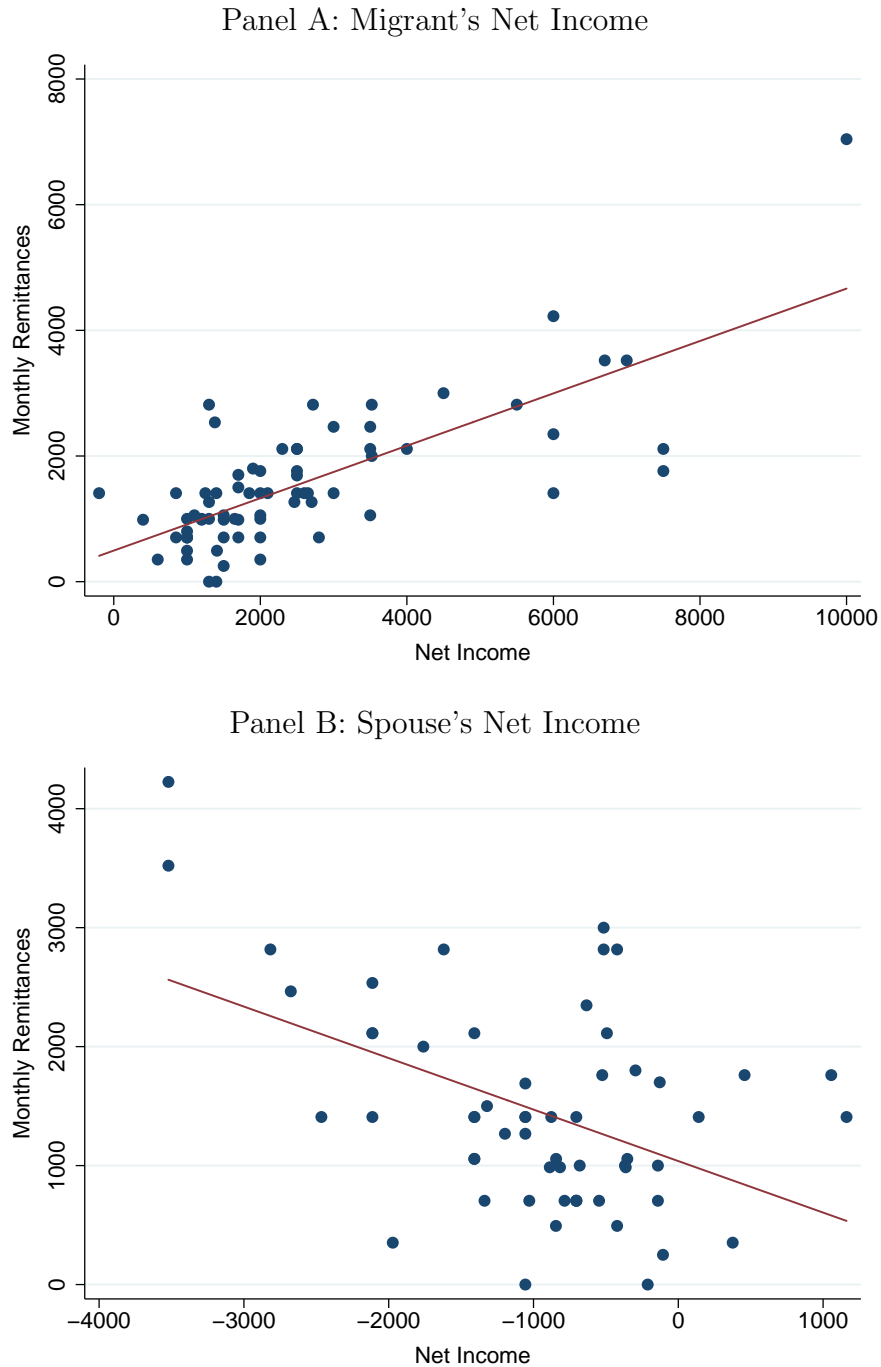


FIGURE I: PROJECT TIMELINE

FIGURE II: MONTHLY REMITTANCES AGAINST NET INCOME



Notes: The figure shows scatter plots and linear regression lines for the control group. Remittances are measured in dirhams per month and were reported in the migrant baseline survey. Net income is reported monthly income net of reported monthly expenses, measured in dirhams. Panel A shows the relationship of remittances with migrant's reported net income and panel B shows it for spouse's reported net income.

FIGURE III: INFORMATION ASYMMETRY AT BASELINE

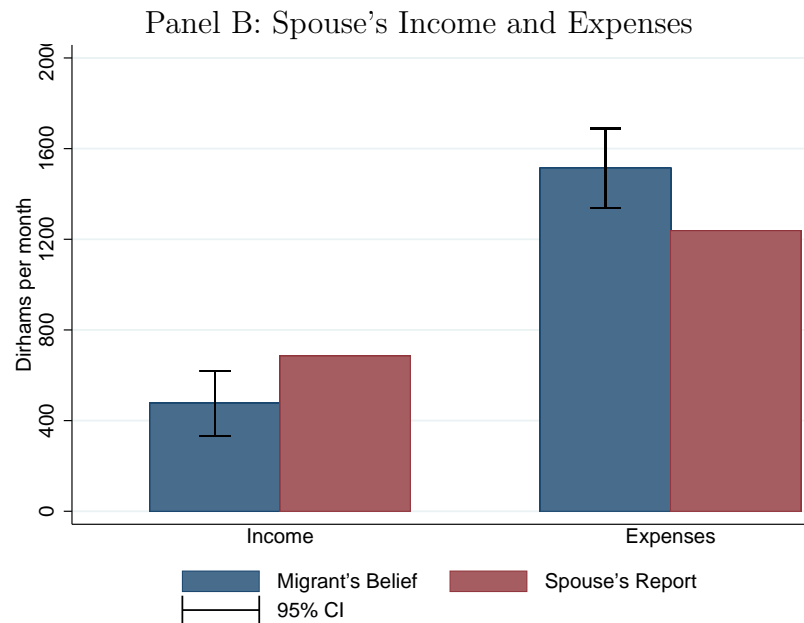
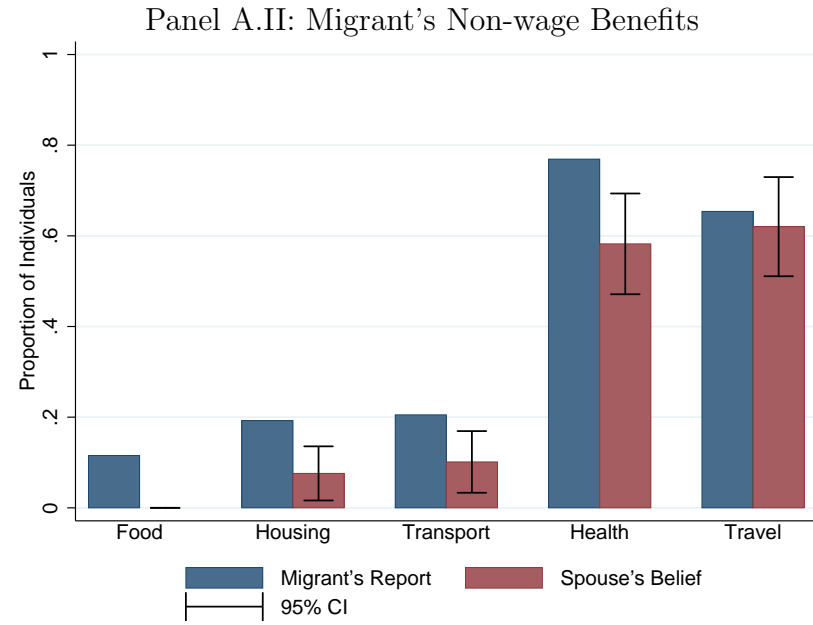
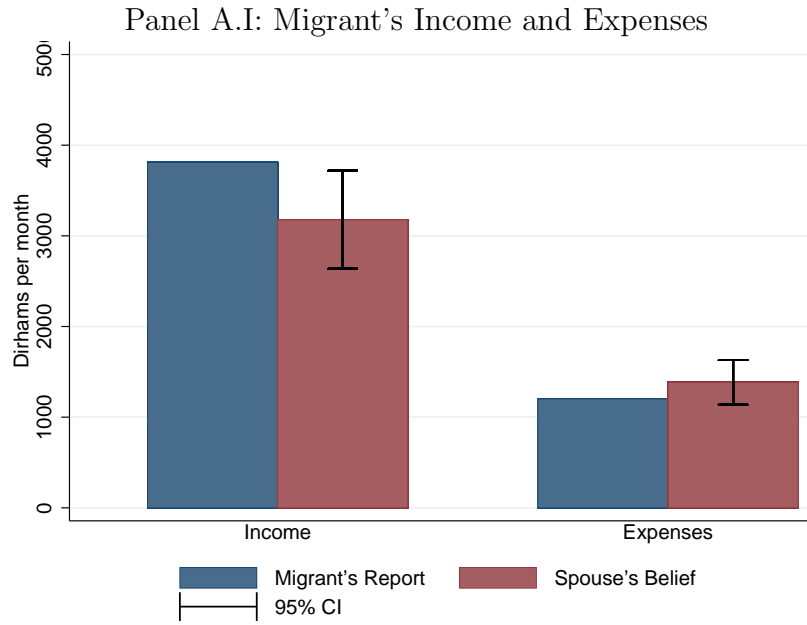
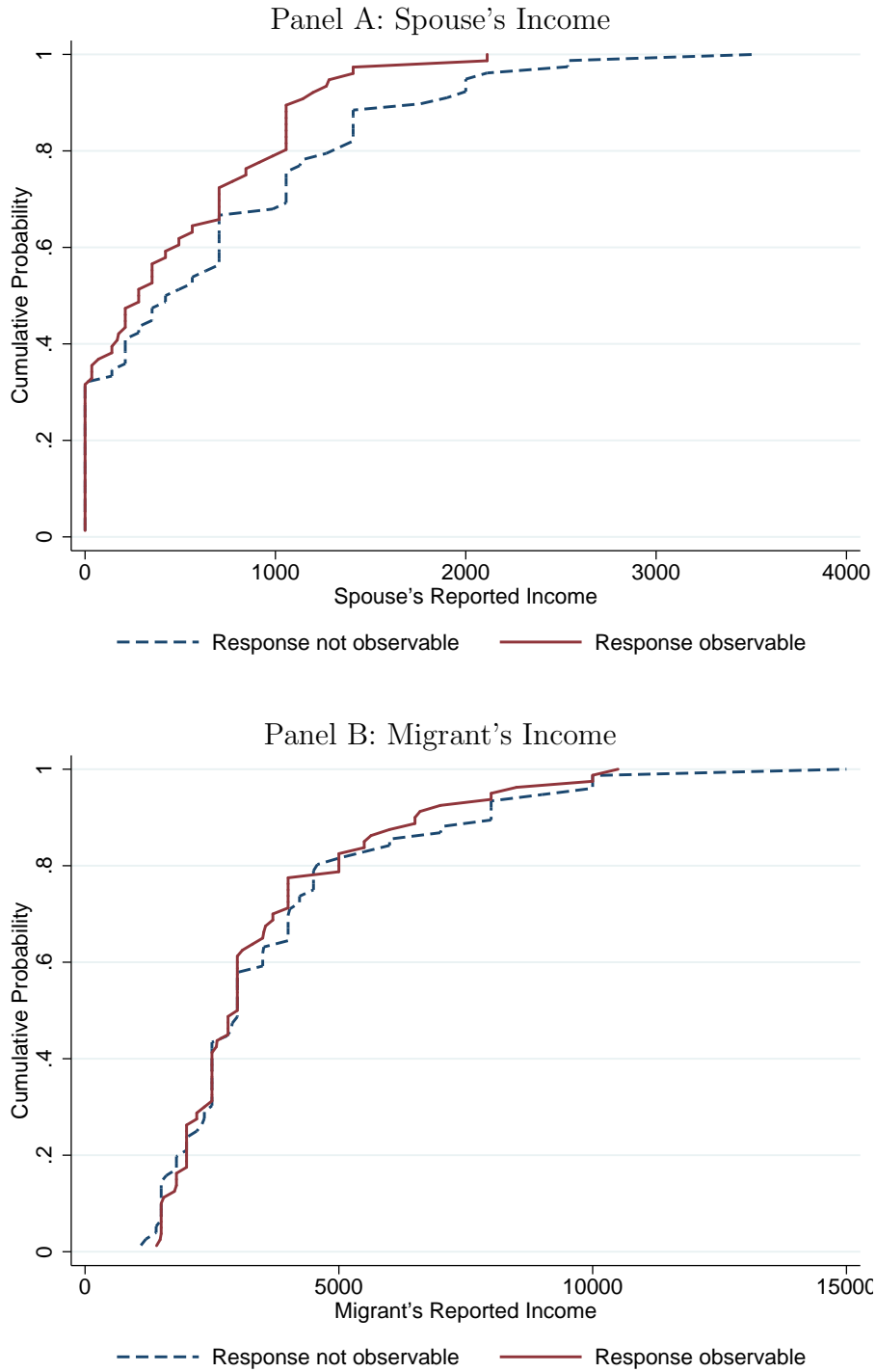


FIGURE IV: CUMULATIVE DISTRIBUTION OF REPORTED INCOME



Notes: Panels A and B plot the empirical cumulative distribution of the spouse's and migrant's reported incomes, respectively.

TABLE I: MIGRANT BASELINE SUMMARY STATISTICS: SELECTION & BALANCE

	Selection			Balance		
	(1) Invited Sample	(2) Participating Sample	(3) Diff p-val	(4) Treat	(5) Control	(6) Diff p-val
Treatment	0.50	0.51	(0.82)	1.00	0.00	
Spouse participated		0.61		0.54	0.64	(0.21)
Migrant Surveyed Second		0.24		0.22	0.26	(0.62)
Demographics						
Male	0.69	0.62	(0.02)	0.63	0.60	(0.73)
Age	37.45	37.61	(0.74)	37.58	37.64	(0.96)
Children	1.95	2.09	(0.08)	2.02	2.17	(0.50)
Income range (AED/month)						
Less than 1,500	0.05	0.08	(0.09)	0.06	0.09	(0.51)
1,500 - 3,000	0.33	0.30	(0.27)	0.30	0.29	(0.98)
3,000 - 4,500	0.26	0.29	(0.39)	0.31	0.27	(0.59)
4,500 - 6,000	0.10	0.09	(0.63)	0.12	0.06	(0.20)
6,000 - 7,500	0.05	0.04	(0.63)	0.02	0.06	(0.23)
7,500 - 9,000	0.03	0.04	(0.46)	0.04	0.05	(0.66)
9,000 - 10,000	0.02	0.01	(0.48)	0.00	0.03	(0.16)
Greater than 10,000	0.06	0.06	(0.99)	0.09	0.04	(0.21)
Occupation						
Food & Personal Services	0.20	0.17	(0.22)	0.14	0.21	(0.25)
Sales	0.16	0.13	(0.15)	0.15	0.10	(0.39)
Construction & Maintenance	0.10	0.13	(0.15)	0.14	0.13	(0.89)
Administration	0.09	0.08	(0.38)	0.10	0.05	(0.26)
Communication and Control						
Years in UAE	7.05	6.79	(0.44)	6.93	6.65	(0.73)
Years since last visit		1.81		2.05	1.56	(0.12)
Visits per year		0.74		0.69	0.78	(0.29)
Relatives in UAE		2.69		2.43	2.95	(0.36)
Spouse HH members		3.29		3.32	3.26	(0.83)
Spouse lives with In-laws		0.30		0.34	0.26	(0.33)
Discuss budget (times per month)	1.10	1.06	(0.81)	1.37	0.78	(0.12)
Want more control of spending	0.43	0.42	(0.82)	0.46	0.39	(0.17)
Instruct spouse on spending	0.52	0.55	(0.24)	0.58	0.53	(0.49)
Remittance Behavior						
Spouse is main recipient	0.99	0.99	(0.50)	1.00	0.99	(0.32)
Other recipients	1.06	1.18	(0.18)	1.16	1.21	(0.84)
Remit monthly	0.90	0.91	(0.64)	0.93	0.89	(0.35)
Remittance (dirham/month)	1,555	1,449	(0.23)	1,330	1,517	(0.16)
<i>N</i>	492	159		81	78	

Notes: Columns (1) and (2) show means for all invited migrants and those who participated in the study, respectively. Column (3) shows the p-value from the two-sided t-test of equivalence of means between those who participated and those who were invited but did not participate in the study. Columns (4) and (5) show means within treatment and control groups, respectively. Column (6) shows the p-value from the two-sided t-test of equivalence of means between the treatment and control group.

TABLE II: INFORMATION ASYMMETRY AT BASELINE

	Migrant's Report (1)	Spouse's Report (2)	Difference Mean p-val (3) (4)	
Panel A: Migrant's Information				
Income	3809.29	3178.31	630.98	(0.12)
Expenses	1201.39	1384.88	-183.49	(0.24)
Net Income	2634.66	2136.65	498.01	(0.17)
Employment Benefits				
Food	0.12	0.00	0.12	(0.00)***
Housing	0.19	0.08	0.12	(0.03)**
Transport	0.21	0.10	0.10	(0.07)*
Health	0.77	0.58	0.19	(0.01)**
Travel	0.65	0.62	0.03	(0.66)
Panel B: Spouse's Information				
Income	475.75	684.76	-209.01	(0.06)*
Expense	1513.50	1237.82	275.68	(0.02)**
Net Income	-975.50	-532.78	-442.71	(0.01)**
<i>N</i>	78	79		

Notes: Column (1) shows the means of migrant's reports of their own finances in panel A and the means of their beliefs about their spouse's finances in panel B. Column (2) shows the means of spouse's reports of their own finances in panel B and the means of their belief's about their migrant's finances in panel A. Column (3) shows the difference between the mean reports and beliefs. Column (4) shows the p-value from the two-sided t-test of equivalence of means between reports and beliefs. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels

TABLE III: SPOUSE'S REPORTED INCOME & EXPENSES

	Income		Expenses	
	(1)	(2)	(3)	(4)
Response observable to migrant	-213.3** (104.5) [0.045]	-247.6** (113.4) [0.026]	-85.78 (101.4) [0.399]	-95.83 (93.51) [0.327]
Spouse is male		133.7 (113.7)		-324.1*** (111.9)
Spouse surveyed second		-207.4* (118.9)		-168.9* (101.2)
Migrant's monthly remittances to spouse		-0.0899 (0.0648)		0.0301 (0.0838)
Migrant's remittance: Above median		-85.46 (176.2)		125.7 (173.4)
Migrant wants more control over remittance spending		-15.68 (133.6)		-17.74 (119.9)
Migrant instructs spouse about remittance spending		-196.2 (132.6)		6.264 (126.2)
Migrant discusses budget with spouse: Frequency above median		-10.91 (128.9)		-60.44 (116.5)
Mean when response not observable to migrant	684.8*** (85.89)		1,238*** (77.93)	
Observations	154	154	152	152
R-squared	0.026	0.137	0.005	0.278

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. Outcome variable is reported monthly income in dirham in columns (1)-(2) and reported monthly expenses in dirham in columns (5)-(8). Columns (2) and (4) include migrant baseline income category dummies. Monthly remittance are measured in dirham.

TABLE IV: MIGRANT'S REPORTED INCOME & EXPENSES

	Income		Expenses	
	(1)	(2)	(3)	(4)
Response observable to spouse	-247.9 (379.3) [0.521]	-183.8 (211.2) [0.435]	72.89 (132.7) [0.584]	36.59 (98.05) [0.709]
Migrant is male		426.7* (216.6)		-48.57 (93.27)
Migrant surveyed second		112.6 (236.0)		-90.40 (95.08)
Migrant's monthly remittances to spouse		0.644* (0.353)		0.135 (0.122)
Migrant's remittance: Above median		-419.1 (511.0)		-178.3 (196.8)
Migrant wants more control over remittance spending		-292.4 (247.0)		-133.8 (105.7)
Migrant instructs spouse about remittance spending		487.0* (269.7)		125.2 (103.5)
Migrant discusses budget with spouse: Frequency above median		428.3* (253.5)		-2.62 (119.6)
Years since migrant last visited spouse		-64.67 (60.12)		20.40 (27.59)
Mean when response not observable to spouse	3,809*** (296.5)		1,201*** (97.07)	
Observations	156	156	156	156
R-squared	0.003	0.709	0.002	0.583

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. Outcome variable is reported monthly income in dirhams in columns (1)-(2) and reported monthly expenses in dirhams in columns (3)-(4). Columns (2) and (4) include migrant baseline income category dummies. Monthly remittances are measured in dirham.

TABLE V: SPOUSE'S REPORTED INCOME & EXPENSES: MATCHED COUPLES

	Income			Expenses		
	(1)	(2)	(3)	(4)	(5)	(6)
Response observable to migrant	-309.6** (120.3) [0.013]	-283.6** (117.7) [0.026]	-204.4* (114.9) [0.089]	-19.73 (123.4) [0.878]	-45.56 (122.6) [0.725]	-25.82 (110.9) [0.831]
Spouse surveyed second		-107.8 (127.5)	-199.1 (130.6)		-209.9 (128.3)	-190.0 (119.0)
Days between migrant and spouse surveys		8.695 (8.06)	10.68 (9.705)		-4.619* (8.394)	-2.424 (8.937)
Spouse is male			113.0 (120.6)			-218.8 (141.1)
Migrant's monthly remittances to spouse			-0.0427 (0.140)			0.283** (0.137)
Migrant's remittance: Above median			66.94 (263.5)			-117.0 (257.7)
Migrant wants more control over remittance spending			-132.5 (154.2)			-75.08 (165.9)
Migrant instructs spouse about remittance spending			-52.10 (151.0)			-1.986 (175.3)
Migrant discusses budget with spouse: Frequency above median			-167.2 (172.7)			46.11 (156.0)
Mean when response not observable to migrant	670.3*** (102.6)			1,124*** (96.16)		
Observations	93	93	93	91	91	91
R-squared	0.065	0.090	0.223	0.000	0.034	0.286

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. Outcome variable is reported monthly income in dirham in columns (1)-(3) and reported monthly expenses in dirham in columns (4)-(6). Columns (3) and (6) include migrant baseline income category dummies. Monthly remittances are measured in dirham.

TABLE VI: MIGRANT'S REPORTED INCOME & EXPENSES: MATCHED COUPLES

	Income			Expenses		
	(1)	(2)	(3)	(4)	(5)	(6)
Response observable to spouse	-254.6 (438.9) [0.562]	-311.4 (432.9) [0.487]	-380.1 (277.6) [0.140]	-9.991 (161.2) [0.953]	-31.39 (159.7) [0.855]	-142.7 (145.8) [0.268]
Migrant surveyed second		617.0 (461.7)	318.8 (241.9)		5.769 (159.9)	-89.74 (118.2)
Days between migrant and spouse surveys		-16.08 (19.61)	-16.50 (13.16)		-6.701 (7.274)	-9.239 (6.122)
Migrant is male			454.6 (274.3)			1.335 (112.1)
Migrant's monthly remittances to spouse			0.0353 (0.269)			0.0504 (0.230)
Migrant's remittance: Above median			561.8 (416.2)			35.77 (274.6)
Migrant wants more control over remittance spending			-212.3 (310.5)			-206.7 (144.0)
Migrant instructs spouse about remittance spending			245.8 (299.9)			164.3 (141.1)
Migrant discusses budget with spouse: Frequency above median			695.0** (336.6)			125.2 (156.4)
Years since migrant last visited spouse			-7.30 (43.52)			39.99 (26.53)
Mean when response not observable to spouse	3,697*** (311.8)			1,207*** (110.5)		
Observations	94		94	94		94
R-squared	0.004	0.028	0.769	0.000	0.006	0.577

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. Outcome variable is reported monthly income in dirham in columns (1)-(3) and reported monthly expenses in dirham in columns (4)-(6). Columns (3) and (6) include migrant baseline income category dummies. Monthly remittances are measured in dirham.

TABLE VII: LOG OF SPOUSE'S REPORTED INCOME & EXPENSES

	Log Income		Log Expenses	
	(1)	(2)	(3)	(4)
Response observable to migrant	-0.462** (0.177) [0.009]	-0.524*** (0.176) [0.004]	-0.0604 (0.106) [0.568]	-0.0802 (0.104) [0.449]
Spouse is male		0.167 (0.194)		-0.315** (0.125)
Spouse Surveyed Second		-0.509** (0.228)		-0.138 (0.117)
Migrant's monthly remittances to spouse		0.000291* (0.000167)		0.0000124 (0.0000651)
Migrant's remittance: Above median		-0.669* (0.399)		0.143 (0.147)
Migrant wants more control over remittance spending		0.297 (0.234)		-0.0721 (0.126)
Migrant instructs spouse about remittance spending		-0.439** (0.203)		-0.0134 (0.115)
Migrant discusses budget with spouse: Frequency above median		-0.0826 (0.221)		-0.0441 (0.109)
Mean when response not observable to migrant	6.639*** (0.110)		6.945*** (0.0733)	
Observations	105	105	152	152
R-squared	0.062	0.290	0.002	0.222

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. Outcome variable is log of reported monthly income in dirham in columns (1)-(2) and log of reported monthly expenses in dirham in columns (5)-(8). Columns (2) and (4) include migrant baseline income category dummies. Monthly remittances are measured in dirham.

TABLE VIII: TREATMENT EFFECT HETEROGENEITY BY GENDER

	Spouses		Migrants	
	(1)	(2)	(3)	(4)
Treatment	-247.6** (113.4) [0.026]	-321.3** (148.2) [0.032]	-183.8 (211.2) [0.435]	-571.5** (284.3) [0.056]
Treat x Male		221.6 (214.7) [0.312]		660.0 (426.3) [0.141]
Treatment + (Treat x Male)		-99.72 (159.7) [0.530]		88.58 (304.5) [0.791]
Controls	Y	Y	Y	Y
Observations	154	154	156	155
R-squared	0.137	0.143	0.709	0.713

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. The outcome variable is reported monthly income in dirhams. Male is a dummy equal to one if the spouse is male in columns (1) and (2), and if the migrant is male in column (3) and (4). All regressions include the controls used in the main results.

TABLE IX: SPOUSE'S REPORTED INCOME: HETEROGENEOUS TREATMENT EFFECT

	Communication & Control			Remittance Behaviour		
	Control	Instruct	Budget	Amount	Median	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-247.6** (113.4) [0.026]	-568.7*** (147.7) [0.000]	-566.2*** (183.7) [0.003]	-596.6*** (194.1) [0.004]	-365.3** (180.9) [0.05]	-195.6 (139.2) [0.160]
Treat x Trait		717.2*** (203.5) [0.002]	565.8** (222.7) [0.017]	527.6** (225.3) [0.031]	0.0836 (0.0916) [0.376]	-155.8 (226.2) [0.532]
Treatment + (Treat x Trait)		148.5 (150.9) [0.335]	-0.452 (129.7) [0.999]	-68.96 (127.9) [0.597]	-365.2** (180.9) [0.05]	-351.4* (184.6) [0.064]
Controls	Y	Y	Y	Y	Y	Y
Observations	154	154	154	154	154	154
R-squared	0.137	0.202	0.176	0.170	0.141	0.140

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. The outcome variable is reported monthly income in dirhams. The Trait variable is defined in the title of each column. Control, Instruct, and Budget, are dummies equal to one if the migrant reports wanting more control over how remittances are spent, instructing their spouse on how to spend remittances and discussing the household budget with their spouse more than the median frequency. Remittance amount is monthly remittances in dirhams and Remittance Median is a dummy equal to one if the migrant reports sending more remittances than the median amount. All regressions include the controls used in the main results.

TABLE X: MIGRANT'S REPORTED INCOME: HETEROGENEOUS TREATMENT EFFECT

	Communication & Control			Remittance Behaviour		
	Control	Instruct	Budget	Amount	Median	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-183.8 (211.2) [0.435]	-43.00 (365.5) [0.906]	-583.7 (354.5) [0.130]	-507.5 (480.8) [0.275]	904.9** (406.0) [0.095]	232.4 (219.1) [0.330]
Treat x Trait		-305.9 (476.9) [0.490]	697.0 (424.5) [0.150]	495.1 (548.6) [0.352]	-0.767** (0.303) [0.049]	-1,295** (582.1) [0.023]
Treatment + (Treat x Trait)		-348.9 (250.6) [0.171]	113.4 (250.7) [0.699]	-12.41 (225.7) [0.958]	903.7 (405.7) [0.095]	-1,063** (510.2) [0.041]
Controls	Y	Y	Y	Y	Y	Y
Observations	156	155	155	155	155	155
R-squared	0.709	0.710	0.714	0.711	0.735	0.724

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. The outcome variable is reported monthly income in dirhams. The Trait variable is defined in the title of each column. Control, Instruct, and Budget, are dummies equal to one if the migrant reports wanting more control over how remittances are spent, instructing their spouse on how to spend remittances and discussing the household budget with their spouse more than the median frequency. Remittance amount is monthly remittances in dirhams and Remittance Median is a dummy equal to one if the migrant reports sending more remittances than the median amount. All regressions include the controls used in the main results.

TABLE XI: DIFFERENCES BY GENDER: MIGRANT BASELINE

	Men			Women			Pooled	
	Treatment (1)	Control (2)	p-val (3)	Treatment (4)	Control (5)	p-val (6)	Difference (7)	p-val (8)
Demographics								
Age	38.37	38.62	(0.85)	36.23	36.16	(0.97)	-2.29	(0.05)*
Children	2.00	2.26	(0.36)	2.07	2.03	(0.91)	-0.07	(0.73)
Income range (AED/month)								
Less than 1,500	0.02	0.09	(0.16)	0.13	0.10	(0.66)	0.06	(0.18)
1,500 - 3,000	0.25	0.21	(0.63)	0.37	0.42	(0.68)	0.16	(0.04)**
3,000 - 4,500	0.33	0.28	(0.55)	0.27	0.26	(0.94)	-0.04	(0.55)
4,500 - 6,000	0.18	0.09	(0.18)	0.03	0.03	(0.98)	-0.10	(0.02)**
6,000 - 7,500	0.02	0.04	(0.52)	0.03	0.10	(0.32)	0.03	(0.34)
7,500 - 9,000	0.02	0.06	(0.28)	0.07	0.03	(0.54)	0.01	(0.81)
9,000 - 10,000	0.00	0.02	(0.32)	0.00	0.03	(0.33)	0.01	(0.75)
Greater than 10,000	0.12	0.06	(0.36)	0.03	0.00	(0.33)	-0.08	(0.03)**
Occupation								
Services	0.14	0.19	(0.48)	0.13	0.23	(0.35)	0.02	(0.78)
Food Services	0.12	0.17	(0.47)	0.03	0.00	(0.33)	-0.13	(0.00)***
Personal Service	0.02	0.02	(0.95)	0.10	0.23	(0.19)	0.14	(0.01)**
Sales	0.10	0.13	(0.65)	0.27	0.10	(0.09)*	0.07	(0.25)
Construction & Maintenance	0.20	0.17	(0.74)	0.03	0.06	(0.58)	-0.13	(0.01)**
Administration	0.08	0.02	(0.19)	0.13	0.06	(0.38)	0.05	(0.29)
Monitoring and Control								
Years in UAE	7.82	6.77	(0.32)	5.40	6.48	(0.36)	-1.37	(0.08)*
Years since last visit	2.41	1.60	(0.18)	1.43	1.52	(0.74)	-0.54	(0.04)**
Visits per year	0.70	0.76	(0.60)	0.66	0.81	(0.31)	0.00	(0.96)
Relatives in UAE	2.25	2.57	(0.63)	2.73	3.52	(0.46)	0.73	(0.24)
Spouse HH members	3.52	3.46	(0.85)	2.96	2.97	(0.99)	-0.52	(0.07)*
Spouse lives with In-laws	0.35	0.19	(0.07)*	0.31	0.38	(0.59)	0.07	(0.37)
Discuss budget per month	0.63	0.36	(0.01)**	0.53	0.65	(0.38)	0.09	(0.27)
Want more control of spending	0.43	0.26	(0.07)*	0.60	0.48	(0.37)	0.19	(0.02)**
Instruct spouse on spending	0.55	0.43	(0.23)	0.63	0.68	(0.72)	0.17	(0.04)**
Remittance Behavior								
Spouse is main recipient	1.00	0.98	(0.32)	1.00	1.00	(.)	0.01	(0.32)
Other recipients	1.10	1.19	(0.76)	1.27	1.23	(0.90)	0.10	(0.64)
Remit monthly	0.96	0.87	(0.12)	0.89	0.93	(0.62)	-0.01	(0.91)
Remittance (AED/month)	1579.26	1888.70	(0.21)	1104.41	1167.25	(0.81)	-581.83	(0.00)***
<i>N</i>	51	47		30	31			

Notes: Columns (1) and (2) show means for male migrants in the treatment and control group, respectively. Columns (4) and (5) show means for female migrants in the treatment and control group, respectively. Columns (3) and (6) show the p-values from the two-sided t-tests of equivalence of means between the treatment and control group for male and female migrants respectively. Column (7) shows the overall difference of means between male and female migrant participants. Column (8) shows the p-value from the two-sided t-test of equivalence of means of male and female migrant participants. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels

A Appendix

A.I Remittances and Income: Comparative Statics

I present an income-sharing model that adapts the exchange-based model from [Rapoport & Docquier \(2006\)](#) and shows that remittances are increasing in the migrant's income and decreasing in the spouse's income.

Consider two agents, the migrant (M) and their spouse (S). Each agent has their respective pre-transfer income (y) and consumption (c). The migrant sends a remittance (r) to their spouse while in return the spouse provides household or childcare services (h). Each agent derives utility (U_i for $i=M, S$) from their own consumption with diminishing marginal utility ($u'_i(c_i) > 0$ and $u'_i(c_i) < 0$). Each agent's consumption increases in their income ($c'_i(y_i) > 0$ for $i=M, S$). The migrant's consumption decreases, while the spouse's consumption increases with remittances ($c'_M(r) < 0$ and $c'_S(r) > 0$). The migrant also derives increasing utility from the service provided by the spouse ($u'_M(h) > 0$), whereas the spouse experiences dis-utility of effort from providing the service ($u'_S(h) < 0$).

Both the migrant and spouse must accept the terms of the income-sharing contract. Suppose that to accept a contract the spouse requires a minimum compensating utility of (\bar{U}_S). This utility level is based on the spouse's expectations of the level consumption they will enjoy and the level of household and childcare services they will have to provide as a result of the temporary migration of the other spouse ($\bar{U}_S(\bar{c}_S, \bar{h})$). If the migrant remits the minimum amount such that the spouse will accept, the remittance amount must be such that:

$$U_S(c_S(y_S, r), h) \geq \bar{U}_S(\bar{c}_S, \bar{h})$$

Solving this acceptance constraint with equality, r may be expressed as $r = r(y_S)$. The

implicit function theorem therefore implies:

$$\frac{\partial r}{\partial y_S} = - \frac{\frac{\partial U_S(c_S, h)}{\partial c_S} \cdot \frac{\partial c_S}{\partial y_S}}{\frac{\partial U_S(c_S, h)}{\partial c_S} \cdot \frac{\partial c_S}{\partial r}} = \frac{\frac{\partial c_S}{\partial y_S}}{\frac{\partial c_S}{\partial r}} < 0$$

The minimum amount of remittances that the spouse is willing to accept decreases with the spouse's income. If the spouse's propensity to consume from income and remittances is the same, i.e. remittances are completely fungible, this becomes a one-to-one relationship. A similar acceptance constraint can be derived for the migrant for the maximum amount they are willing to remit to keep a minimum compensating utility ($\bar{U}_M(\bar{c}_M, \bar{h})$).

$$U_M(c_M(y_M, r), h) \geq \bar{U}_M(\bar{c}_M, \bar{h})$$

Again solving for the comparative static:

$$\frac{\partial r}{\partial y_M} = - \frac{\frac{\partial U_M(c_M, h)}{\partial c_M} \cdot \frac{\partial c_M}{\partial y_M}}{\frac{\partial U_M(c_M, h)}{\partial c_M} \cdot \frac{\partial c_M}{\partial r}} = \frac{\frac{\partial c_M}{\partial y_S}}{\frac{\partial c_M}{\partial r}} > 0$$

As the migrant's consumption decreases with remittances, the maximum amount of remittances that the migrant is willing to send is increasing with the migrant's income.

A.II Subject pool recruitment protocol

The subject pool of migrants was recruited as part of [De Arcangelis & Yang \(2019\)](#). The subject pool is comprised of migrant workers from the Philippines living and working in Dubai, United Arab Emirates (UAE). Migrants were recruited via face-to-face intercepts in locations frequented by Filipino workers in Dubai. Participants had to answer yes to the

following screening questions to enroll in the subject pool:

1. Do you expect to continue working in Dubai for the next twelve months?
2. To participate, you will need to download a mobile application we developed called "Padalapp" that allows OFWs (Overseas Filipino Workers) to record and keep track of their remittances. Are you willing to download the smartphone app Padalapp using our pocket wifi?
3. Are you willing to commit to participating for the whole 12-month study period starting from today?
4. Do you agree to complete the weekly one-question surveys for the next 12 months?
5. Do you agree to receive phone calls, SMS, and FB messages from the research team for the next 12 months? We will only contact you for the purpose of facilitating this study.
6. Do you agree for us to invite your household in the Philippines (we will identify the household respondent later in this interview) to also participate in this study?

Individuals answering yes to all the above questions were then asked to sign a consent form to join the subject pool. Participants were administered a short face-to-face baseline survey to collect baseline characteristics of participants and their households in the Philippines.

To identify the relevant remittance-receiving household in the Philippines, participants were asked to name (and provide contact information for) an individual in the Philippines who would be the recipient of a US\$500 lottery prize (implemented by the study among subject pool participants). The participant's choice identifies an individual (referred to as the target beneficiary) and household (referred to as the target household) in the Philippines whose well-being is important to the participant. Subject pool participants who identified their spouses as either their target beneficiaries or as a member of their target household were invited to participate in the spousal communication experiment.

An overlapping subset of the migrants in the subject pool also participated in the randomized labeled remittances intervention in [De Arcangelis & Yang \(2019\)](#). In my analysis,

I control for the migrants' participation and treatment status, conditional on participation, in this intervention.

A.III Experiment Protocol: Scripts

Introduction SMS - Prior to being called for the survey, participants were sent the following text message from a number identified as IPA (Innovations for Poverty Action):

Hello PARTICIPANT_NAME, I am SURVEYOR_NAME, a surveyor from Innovations for Poverty Action. You have been participating in our study about OFWs remittance behaviour in UAE. We would like to invite you to participate in a new survey about the migration experience of OFWs in UAE and their households in the Philippines. The survey will take about 30 min of your time. By participating you will help inform fellow Filipinos about the migration experience and also learn from their experience. Would you be available at DAY and TIME? If so I would call you then and tell you more details about it.

Introduction Call - Surveyors introduced the study using the following script as part of the consent process:

I would like to invite you to participate in a research study on the migration experience of OFWs in UAE and their households in the Philippines. The purpose of this study is to learn about the experience of OFWs and how we can better inform OFWs and their households about the costs and benefits of living and working in the UAE. By taking part in this study you will learn about these important issues and will also be helping inform fellow Filipinos about them.

If you choose to participate, you will be asked to complete a survey that covers your demographic and financial information. This survey will take approximately 15 minutes of your time. We will also call your spouse and invite them to participate in this study. At the end of the study, we will share our results with you and your spouse, which will include information about the average income, expenditures of OFWs in the UAE and their spouses

in the Philippines.

Treatment Status - The treatment status was revealed during the survey using the following scripts when the surveyor reached the experimental survey section:

Control Group: Now I would like to ask some questions about your experience in the UAE. As I mentioned, we will be sharing with you and your spouse the summary results from this section. Keep in mind that your individual responses will NOT be shared with your spouse or anyone else. This is a separate activity with each spouse and because of the rules of this activity, we will not share your individual responses to the following questions with your spouse. Your individual responses will be kept private.

Treatment Group: Now I would like to ask some questions about your experience in the UAE. As I mentioned, we will be sharing with you and your spouse the summary results from this section. Keep in mind that your individual responses WILL also be shared with your spouse. This is a joint activity with your spouse and because of the rules of this activity, we will share your individual responses to the following questions with your spouse. Your individual responses will not be private.

TABLE A.I: MIGRANT BASELINE SUMMARY STATISTICS OF PARTICIPATING SPOUSES

	Selection			Balance		
	(1) Invited Sample	(2) Participating Sample	(3) Diff p-val	(4) Treat	(5) Control	(6) Diff p-val
Treatment	0.50	0.49	(0.73)	1.00	0.00	
Spouse participated		0.61		0.58	0.63	(0.50)
Spouse Surveyed Second		0.36		0.34	0.38	(0.63)
Demographics						
Male	0.69	0.65	(0.23)	0.67	0.63	(0.62)
Age	37.45	37.79	(0.49)	37.61	37.96	(0.76)
Children	1.95	1.95	(0.99)	1.88	2.01	(0.47)
Income range (AED/month)						
Less than 1,500	0.05	0.06	(0.54)	0.08	0.04	(0.28)
1,500 - 3,000	0.33	0.31	(0.53)	0.28	0.34	(0.38)
3,000 - 4,500	0.26	0.31	(0.13)	0.32	0.30	(0.87)
4,500 - 6,000	0.10	0.09	(0.50)	0.14	0.04	(0.02)*
6,000 - 7,500	0.05	0.05	(0.69)	0.01	0.08	(0.06)
7,500 - 9,000	0.03	0.05	(0.42)	0.03	0.06	(0.27)
9,000 - 10,000	0.02	0.02	(0.91)	0.01	0.03	(0.58)
Greater than 10,000	0.06	0.06	(0.93)	0.07	0.06	(0.95)
Occupation						
Food & Personal Services	0.20	0.17	(0.19)	0.20	0.14	(0.34)
Sales	0.16	0.14	(0.49)	0.09	0.19	(0.08)
Construction & Maintenance	0.10	0.13	(0.20)	0.12	0.14	(0.70)
Administration	0.09	0.10	(0.55)	0.14	0.06	(0.10)
Communication and Control						
Years in UAE	7.05	6.66	(0.24)	6.37	6.94	(0.45)
Years since last visit		1.70		1.98	1.46	(0.19)
Visits per year		0.68		0.59	0.76	(0.10)
Relatives in UAE		2.53		2.14	2.88	(0.28)
Spouse HH members		3.28		3.32	3.24	(0.82)
Spouse lives with In-laws		0.32		0.33	0.31	(0.83)
Discuss budget per month	1.10	1.05	(0.78)	1.26	0.85	(0.32)
Want more control of spending	0.43	0.43	(0.93)	0.45	0.41	(0.60)
Instruct spouse on spending	0.52	0.55	(0.32)	0.55	0.54	(0.92)
Remittance Behavior						
Spouse is main recipient	0.99	0.99	(0.71)	1.00	0.97	(0.16)
Other recipients	1.06	1.12	(0.51)	0.89	1.34	(0.04)*
Remit monthly	0.90	0.89	(0.55)	0.93	0.86	(0.15)
Remittance (dirham/month)	1,555	1,513	(0.65)	1,421	1,601	(0.36)
<i>N</i>	492	155		76	79	

Notes: Columns (1) and (2) show means for the migrants of all invited spouses and those spouses who participated in the study, respectively. Column (3) shows the p-value from the two-sided t-test of equivalence of means between those who participated and those who were invited but did not participate in the study. Columns (4) and (5) show means within treatment and control groups, respectively. Column (6) shows the p-value from the two-sided t-test of equivalence of means between the treatment and control group.

TABLE A.II: LOG OF MIGRANT'S REPORTED INCOME & EXPENSES

	Log Income		Log Expenses	
	(1)	(2)	(3)	(4)
Response observable to spouse	-0.0294 (0.0876) [0.743]	-0.0276 (0.0509) [0.614]	0.119 (0.124) [0.339]	0.0956 (0.109) [0.353]
Migrant is male		0.122** (0.0575)		-0.0218 (0.109)
Migrant surveyed second		0.0161 (0.0620)		-0.127 (0.109)
Migrant's monthly remittances to spouse		0.00008* (0.00005)		0.00009 (0.00069)
Migrant's remittance: Above median		0.0374 (0.0899)		0.0498 (0.150)
Migrant wants more control over remittance spending		-0.0466 (0.0579)		-0.188* (0.111)
Migrant instructs spouse about remittance spending		0.0380 (0.0613)		0.181* (0.100)
Migrant discusses budget with spouse: Frequency above median		0.109* (0.0635)		-0.0275 (0.120)
Years since migrant last visited spouse		-0.0170 (0.0187)		0.0254 (0.0255)
Mean when response not observable to spouse	8.068*** (0.0664)		6.814*** (0.0946)	
Observations	155	155	156	156
R-squared	0.001	0.696	0.006	0.493

Notes: Robust standard errors in parentheses. ***, **, * denote significance at the 1 percent, 5 percent and 10 percent levels, respectively. Randomization inference p-values for 5000 replications of the treatment assignment are shown in square brackets. Outcome variable is log of reported monthly income in dirhams in columns (1)-(2) and log of reported monthly expenses in dirhams in columns (3)-(4). Columns (2) and (4) include migrant baseline income category dummies. Monthly remittances are measured in dirham.

TABLE A.III: BENCHMARKING MAGNITUDES OF NON-EXPERIMENTAL AND EXPERIMENTAL RESULTS

Study	Sample	Design	Results
Seshan & Zubrickas (2017)	Male migrants in Qatar and their wives in India	Non-experimental: Separate surveys with migrants and wives	Wives underestimate migrant earnings by 25%
Baseler ((forthcoming))	Migrants in urban Kenya and their parents in their origin village in Kenya	Non-experimental: Separate surveys with migrants and head of households	Migrants' parents underestimate migrant income by 50%
Baseler ((forthcoming))	Migrants in urban Kenya and their friends in their origin village in Kenya	Non-experimental: Separate surveys with migrants and friends	Migrants' friends underestimate migrant income by 30%
McKenzie <i>et al.</i> (2013)	Potential emigrants from Tonga to New Zealand, with and without relatives in New Zealand	Non-experimental: Survey of potential emigrants, comparing those with and without relatives in New Zealand	Potential migrants with relatives in New Zealand underestimate potential income in New Zealand by 35%
This study	Migrants in UAE and their spouses in Philippines	Non-experimental: Separate surveys of migrants and spouses	Migrants estimate spouse's incomes by 30%
This study	Migrants in UAE and their spouses in Philippines	Experimental: Varying spousal observability of reported information	Spouses underreport income by 31% when it is observable to the migrant

TABLE A.IV: 2019 DISTRIBUTION OF FILIPINO MIGRANTS BY DESTINATION AND GENDER

Destination	Percentage of Total Migrants	Percentage Male	Percentage Female
Asia	81.1	37.2	62.8
Middle East	51.4	34.4	65.6
Saudi Arabia	22.4	43.4	56.7
United Arab Emirates	13.2	30.7	69.6
Kuwait	6.2	14.2	85.8
Qatar	5.6	43.2	57.0
Other Middle East & Western Asia	4.0	16.5	82.6
East Asia	21.7	43.0	57.0
Hong Kong	7.5	6.5	93.3
Taiwan	6.7	53.9	46.0
Japan	3.8	67.2	33.9
Other East Asia	3.7	72.5	27.2
Southeast Asia	8.0	39.1	61.6
Singapore	4.1	32.2	68.3
Malaysia	2.1	37.7	64.0
Other Southeast Asia	1.8	58.7	43.6
North & South America	8.1	71.2	29.0
Europe	7.7	73.7	26.2
Australia	2.1	75.4	24.0
Africa	1.0	83.6	16.8
Total	100	44.0	56.0

Notes: Data is from the Philippine Statistics Authority, 2019 Survey on Overseas Filipinos. Numbers may not add up to totals due to rounding. The estimates cover overseas Filipinos whose departure occurred within the last five years from the survey and who are working or had worked abroad during the past six months (April to September) of the survey period