# 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 resource allocation in the household? I analyze this question in the context of transnational households - where one spouse temporarily migrates for work. Misreporting, by definition, involves purposefully concealing information, making it difficult to identify. I address this challenge using a novel field experiment among Filipino migrants in the UAE and their spouses in the Philippines. I find that both migrants and spouses have biased beliefs about each other's finances and these biases are the result of strategic misreporting. Spouses and certain subgroups of migrants underreport their income to influence the remittance decision in their favor. Misreporting is greater when information is more difficult to observe and less likely to be verified. The results are consistent with an income-sharing model where both spouses have private information and income hiding is constrained by the threat of punishment.

**Keywords**: Asymmetric information, hidden income, migration, remittances
**JEL Classification:** D13, D82, J61, O15

# 1 Introduction

In household decision-making, information sharing plays a key role in determining outcomes. Although most models of the household 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 in the household (Ashraf, 2009; Castilla & Walker, 2013; Chen, 2006; De Laat, 2014).

Although private information is a non-trivial concern for all households, it is especially relevant for transnational households - where one spouse temporarily migrates for work and shares a considerable portion of their income as remittances. These remittances are economically significant intra-household transfers and the primary motivation for most temporary migration.[1] However, the remittance decision is made under considerable information asymmetry as migrants and the spouses staying back 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, 2018; McKenzie *et al.*, 2013).

While the effects of information asymmetry are well established, the persistence of information asymmetry, despite regular communication between spouses, remains puzzling. While communication can reduce information frictions (Batista & Narciso, 2013), it can instead create or exacerbate information asymmetry if spouses purposefully misreport information to each other to influence the remittance decision in their favor.[2]

In this paper, I analyze if information asymmetry is caused by migrants and spouses

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[1]In 2016, remittances sent to developing countries amounted to USD $429 billion, roughly three times official development aid (World Bank, 2017).

[2]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.

strategically misreporting information to each other. First, I document the extent of information asymmetry between migrants and spouses across multiple margins. Next, I analyze if this asymmetry is the result of strategic misreporting. The defining characteristic of misreporting is that individuals are purposefully concealing information making it inherently difficult to observe. I address this challenge by using a novel experimental strategy to observe misreporting . Finally, I explore factors that exacerbate or mitigate misreporting. The UAE-Philippines migration corridor provides a relevant context for my study. The UAE has a large remittance-sending migrant population and immigration policies that lead to the creation of transnational households, while in the Philippines, a significant proportion of households rely on the remittances these migrants send to sustain themselves.

The prior literature on asymmetric information in transnational households includes 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 analyzing strategic misreporting on *both sides* of the remittance relationship, across *multiple* margins. The key challenge in identifying strategic misreporting as the cause of information asymmetry in non-experimental settings is that spousal communication cannot be observed. These studies must infer strategic misreporting as the mechanism for other observed outcomes. Using this strategy, Seshan & Zubrickas (2017) show that spouses in India underestimate migrant earnings and the underestimation is associated with lower remittances. Joseph *et al.* (2018) show that remittances from the UAE respond more to observable shocks in income than unobservable shocks. Baseler (2018) and McKenzie *et al.* (2013) show that migrant-sending households in Kenya and potential migrants in Tonga, respectively, underestimate the returns to migration despite significant information flows between migrants and household members. In contrast, I directly observe spousal information-sharing. This allows me to identify strategic misreporting as the cause of information asymmetry in transnational households, filling a key gap in the literature.

Lab and lab-in-field experiments also provide settings where spousal communication and

decision-making can be directly observed.[3] 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). However, as these studies accede, their findings may be limited to decision-making over one-time 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 lower. I move this research agenda forward by analyzing how results from these lab and lab-in-field settings translate when transnational households share information about their actual finances.

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 their spouse compared to when it is not. I implement this by inviting married temporary Filipino migrants in the UAE and their spouses in the Philippines to separately participate in a survey. The survey is marketed 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 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. 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 in the information reported by the treatment and the control groups.

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[3] Ashraf (2009) and Castilla & Walker (2013) show that in co-residing households, spouses strategically use private information and lack of communication for personal gain.

I document four findings. First, both migrants and spouses have biased beliefs about each other's finances. Migrants underestimate spouses' income and overestimate spouses' expenses, whereas spouses underestimate migrants' less-observable non-wage benefits. Second, these biases are the result of strategic misreporting. Spouses underreport their monthly income by 31 percent (213 dirham or USD $58) when it is observable to the migrant. This income hiding is greater when the migrant also participates in the study. Third, misreporting is greater when information is more difficult to observe and less likely to be verified. Spouses hide 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. Income hiding 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. Fourth, among both migrants and spouses, women are more likely to hide income. These gender differences appear to be driven by men less frequently demanding control over and communicating about the household's finances.

These results are informative to policy-making where there is a growing interest in financial products and services for transnational households that leverage information sharing and control. These products are motivated by the idea that greater control and information sharing will improve financial decision-making but experimental evaluations have found mixed results.[4] 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. I find that the strategic behavior these products aim to address is limited to certain subgroups of transnational households, suggesting that these products would be most effective when targeted to these households. Importantly, my results also show that these subgroups can be identified from observable baseline characteristics.

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

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. Section 4 and 5 describe the experimental design and data, respectively. Section 6 presents the empirical strategy and results. Section 7 discusses other motivations and strategies for income hiding 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 of strategic misreporting on both sides of 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 the spouse's reported net income. Although some portion of their incomes is common knowledge, migrants and spouses have private information about their realized incomes which they report to each other. They can attempt to verify each other's reports and are punished 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 may by private information. Similarly, some portion of the spouse's income may also be unobservable to the migrant. Each spouses 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 back 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, frequent visits, and support from relatives and peers have a greater probability of verifying each other's reports. Successful verification also depends on the amount spent on verification $c_i$, and the magnitude of the misreporting $(\tilde{y}_i - y_i)$.[5] If upon verification either spouse catches the other lying i.e. $\tilde{y}_i < y_i$, they can inflict a 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

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[5]An 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.

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.

## 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 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.[6]

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 in perfect and incurs a fixed cost. The only choice for migrants is whether or not to incur the cost of verification.[7] However, 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.

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[6]Altruism-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.

[7]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.

## 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 which migrants can strategically misreport. Some combination of these institutional settings is present 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. 88 percent of the UAE's 9.6 million population are migrants. 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 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.[8] Even when these income and employment conditions are not binding, the high

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[8]Female 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.

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 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 2018, there were 2.3 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 15.7 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. In 2020, 56 percent of Filipino migrants were women. 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.

# 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 if spouses strategically misreport information to each other.

## 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 strategic misreporting from both sides of the remittance relationship.

The sample was drawn from a subject pool of participants of a separate study on the remittance behavior of migrants.[9] 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

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

in Dubai.[10] Migrants who expected to continue working in the UAE for the following 12 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. Figure I shows the time-line of project activities along with the sample size at each stage.

## 4.2   Experimental Conditions

The experimental conditions were designed to identify strategic misreporting 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 information about their finances and employment, and their beliefs about their spouse's finances; with the migrant reporting their information in

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[10]The 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.

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.

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 spouse and that their responses in the following section would be shared with and observable to their spouse. 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. 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 spouse. Any difference in the information reported by the treatment and control groups is therefore the causal effect of spousal observability. The experimental design allows me to identify strategic misreporting 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. Any measurement issues related to self-reporting would equally affect the treatment and control groups and therefore not bias my results.

Random assignment was done at the couple level using the baseline survey data and was not stratified by any pretreatment characteristics.[11] 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 their 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.

# 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.

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[11]Treatment assignment was done at the couple level to avoid any household conflict from spouses being assigned different treatment status.

69 percent of the invited migrant sample are men. 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.[12]

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 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. 90 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 migrant's monthly income.[13] 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

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[12]Other 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

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

at baseline, migrants were asked about their financial decision-making. Migrants report discussing household budgets with their spouses on average once per month. 43 percent of migrants say they would like more control over how their spouse spends remittances, while around half report that they instruct their spouses on how to spend remittances.

## 5.2    Selection and Balance

I test for selection into the study and selection into treatment to address concerns about external and internal validity of the experiment. I do not find evidence of either type of selection based on observables and 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 misreporting. 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) on 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

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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 misreporting. As the treatment status was assigned before contacting migrants, 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 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.

# 6 Empirical Analysis and Results

Using a combination of descriptive and experimental results I show that there is significant information asymmetry between migrants and spouses and this asymmetry is driven by strategic misreporting. Information asymmetry and strategic misreporting is greater when information is more difficult to observe and less likely to be verified. Spouses and certain subgroups of migrants strategically underreport income to influence the remittance decision in their favor. Spouses hide 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 hidden when migrants do not demand control over or regularly communicate about the household's finances, making them less likely to verify reported information.

## 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 migrant's 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 remittances they have to send. Panel B shows that remittances are negatively correlated with spouse's net income. The slope of the regression line in -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 information asymmetry of migrant's income among migrant-

sending households (Baseler, 2018; 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 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.[14]

Panel A of figure III shows 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 on means).

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

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 spouse's income and overestimate 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 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 causally identify whether these biased beliefs are the result of strategic misreporting I now analyze the results of the spousal observability experiment.

## 6.2 Experimental Analysis & Results

### 6.2.1 Specification

To identify strategic misreporting I estimate the following OLS regressions in the experimental results that follow:

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

$Y_i$ is the outcome of interest, either reported income or expenses. In the main speci-fication, both outcomes are measured as average monthly amounts in dirhams. $T_i$ is the treatment status indicator, $X_i$ is a vector of controls from the baseline survey and $\epsilon_i$ is the error term adjusted for heteroskedasticity. The coefficient $\beta$ 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 esti-mates. I also report randomization inference p-values for the treatment estimates from 5,000 replications of the treatment assignment. All controls are from the migrant baseline survey and include demographic characteristics, baseline income-category dummies, and measures of monitoring and remittance behavior.

### 6.2.2   Main Results

Spouses hide income by strategically underreporting it when it is observable to the migrant. Income is hidden on the intensive margin by underreporting known sources of income and hiding is greater when the migrant also participates in the study, reinforcing the result that underreporting is driven by spousal observability. I do not find evidence of income misreporting by migrants. Neither migrants nor spouses misreport expenses.

Table III shows the treatment effect of migrant observability on 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 strategic misreporting. 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 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 strategically misreport their expenses. 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.

Table IV shows the results of spousal observability for migrants. 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). Although for income the treatment coefficients are around 6 percent of the control mean, because of the large variation I do not find statistically significant evidence that migrants underreport income when it is observable to their spouse. These results persist after controlling for migrant baseline characteristics in columns (2). Similar to spouses, I do not find evidence that migrants misreport expenses.

The migrant results match the descriptive findings of limited information asymmetry among spouses 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. This descriptive evidence is corroborated by the experimental evidence that also does not show strategic misreporting by migrants.

To further analyze the relationship between misreporting and spousal observability I leverage the variation in migrant and spousal participation in the study. My sample includes migrants whose spouses did not participate, spouses whose migrants did not participate and matched couples, where both the migrant and spouse participated. If an individual knows that their spouse is not participating in the study, treatment assignment will not affect spousal observability as reported information will remain private regardless of an individual's treatment status. Similarly if an individual in the treatment group knows that their spouse is participating in the study, they may perceive a greater liklihood of their information being shared with and observable to their spouse.[15] While I do not inform individuals about their spouses' participation status, they may share this information with each other directly. As a result the intensity of the spousal observability treatment should be higher for matched couples and lower for cases where only the migrant or spouse participates.

To test for such a response, I re-estimate the treatment effects restricting the sample to matched couples - cases where both the migrant and their spouse participated in the study and therefore the affect of spousal observability should be greater. The results for spouses using the sample of matched couples are shown in table V. Spouses hide 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. For expenses I again do not find any evidence of misreporting 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 strategic income or expense misreporting by migrants. The greater impact of participating as a matched couple on spouses may be driven by spouses being surveyed after migrants (see figure I for the project time-line). Although participants were not informed of the survey order, spouses are more likely to know the migrant's participation status because migrants were surveyed

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[15]Although participants in the treatment group were not told that the sharing of information with their spouse is conditional on their spouse's participation, they may still believe that information sharing is more likely if their spouse participates.

before them.

Spouses can hide income at the intensive margin, by underreporting but still reporting positive income from a source known by the migrant, 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 hiding 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 report zero income i.e. the remittances they receive are their only reported income source. Spouses do not hide 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 misreporting 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 income hiding is driven primarily by the intensive margin of underreporting known sources of income which is harder for migrants to verify.[16]

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[16]Appendix 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

## 6.3 Heterogeneity & Mechanisms: Who is Hiding and Why?

Based on the conceptual framework presented in section 2 strategic misreporting is motivated by the benefits from hiding income and constrained by the likelihood and punishment from being caught. It is therefore instructive to examine whether income hiding varies by characteristics associated with greater benefits from hiding and increased ability of couples to verify each other's reported income. In this section, I analyze treatment effect heterogeneity by measures of communication and control over the household's finances, remittance behavior and gender. I find that spouses only hide income when migrants do not demand control over or regularly communicate about the household's finances, making them less likely to verify reported information. High remittance sending migrants hide income to avoid sending even more remittances. Among both migrants and spouses, women are more likely to hide income. These gender differences also appear to be driven by men less frequently demanding control over and communicating about the household's finances.

### 6.3.1 Specification

I estimate the following modified regression:

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

$T_i \times x_i$ is the interaction between the treatment status and trait $x_i$. The coefficient $\beta$ is now the average treatment effect for individuals that do not have trait $x$, $\lambda$ is the difference between the average treatment effect of individuals that have and do not have trait $x$, and the sum of $\beta$ and $\lambda$ 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

and spouse's expenses are less informative because they are never zero.

controls $X$ which always includes the main effect of trait $x$.

The results are shown in table VIII for spouses and table IX 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 reproduces the main income results for spouses and migrants from column (2) in table III and IV respectively. I again report heteroskedasticity-robust standard errors and randomization inference p-values.

### 6.3.2  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 hiding.

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 income hiding 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 VIII shows that income hiding by spouses is entirely driven by spouses of migrants who do not demand more control over remittance spending. These spouses underreport their income by 573 dirham (USD $156) 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, hide income. For migrants, column (2) of table

IX shows that wanting more control over remittance spending is not associated with greater income hiding.

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 VIII and IX, I test whether increased communication about household finances impacts income misreporting 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 VIII shows that increased instruction and communication about finances from the migrant limits misreporting by spouses. The likelihood of the spouse's misreporting being caught is higher when the migrant regularly communicates about the household's finances. As a results, income hiding 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 576 dirham (USD $157) 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 misreporting, suggesting that increased communication also deters the migrant from hiding 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 strategic income hiding 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.

### 6.3.3    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 income hiding; *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 column (5) and (6) of tables VIII and IX.

Both measures show that migrants that send higher levels of remittances underreport their income when it is observable by their spouse. 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 1,304 dirham (USD $355). 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 low levels of remittances underreport their income to induce migrants to send more.

Income hiding by migrants that send higher remittances may 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 and still have significant money left over to hide, increasing the benefits from hiding it.[17] As my sample of migrants is primarily low-income this may also explain why I do not find evidence of income hiding by migrants on average. In addition, migrants that send higher levels of remittances may

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

also face higher unmet demand for remittances from their spouses. This would encourage income hiding by increasing the likelihood that additional reported income would have to be shared.

## 6.3.4   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 are women, allowing me to analyze the interaction of gender with strategic misreporting for both migrants and their spouses.

The trait *male* in column (7) of table VIII and IX identifies male spouses and male migrants, respectively. I find that among both migrants and spouses, women underreport their income when it is observable to their spouse, whereas for male spouses and migrants the treatment effect of spousal observability is not statistically different from zero. Female spouses underreport their income by 323 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 578 dirham (USD $157) when it is observable to their spouse. 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).

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 X. Female migrants earn lower incomes and send fewer

remittances than male migrants. These differences stem from differences in employment - female migrants are less likely to be employed in the food-service and construction sectors and more likely to be employed in the personal service sector. However, these differences are unlikely to be the cause of greater income hiding by women. Lower incomes are more likely to be associated with less income hiding because low-income migrants have limited ability to send remittances and therefore limited incentives to hide their income (as discussed in section 6.3.3 *Remittance Behavior*). In addition, the findings of differential treatment effects for women among both migrants and spouses suggest that these differences are driven by factors that are not specific to the women's role in the transnational household as remittance sender or recipient and are instead broader.

Women's income hiding may instead be driven by gender norms about income and management of household finances. 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 X shows this norm persists for transnational Filipino households. Among migrants, women are more likely to instruct their spouse on remittance spending and more likely to want more control over the household's finances. As shown in section 6.3.2, these traits limit misreporting by the other spouse, therefore women may be better able to limit income hiding by men.

# 7 Discussion: Other Motivations, Strategies, and Implications for Welfare

In this section, I discuss potential motivations for income hiding other than remittances, strategies for income hiding other than purposeful misreporting, and the implications of income hiding on 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 counterfactual, the overall impact of income hiding on welfare cannot be determined. Even so, the results are still informative to policy discussions on household welfare. Policymakers have focused on interventions that facilitate greater remittances and reduce information asymmetries based on the positive impacts on a variety of measures 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. The conceptual framework implies that if information asymmetry is reduced through a reduction in income hiding by spouses, remittances would also decrease, and vice versa. In such settings, the welfare impacts of information asymmetry reducing or remittance increasing interventions are a priori ambiguous.

Based on the conceptual framework and empirical evidence strategic misreporting is intended to influence remittance levels. However, misreporting may 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 household or family members, migrants may hide income to avoid such sharing.

While the experimental design identifies purposeful misreporting, 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 identified by the treatment effect. This passive misreporting may also explain why despite biased beliefs about expenses, I do not find evidence that migrants or spouses strategically misreport them.

# 8    Conclusion

This paper analyzes spousal communication in transnational households by eliciting the causal effect of spousal observability on reported information to identify 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 strategic misreporting on both sides of the remittance relationship, across multiple margins of the household's actual finances.

I find that both migrants and spouses have biased beliefs about each other's finances. Spouses and certain subgroups of migrants strategically misreport information to each other. Misreporting is greater when information is more difficult to observe and less likely to be verified. The results are consistent with an income-sharing model where both spouses have private information and income hiding is constrained by the threat of punishment.

These results are important for policy-makers considering interventions to reduce information asymmetry among transnational households because they identify strategic misreporting as the cause of this asymmetry. Interventions that only increase communication between spouses would not be able to address this strategic behavior. In focus groups conducted before this study, almost all transnational couples reported communicating with each

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other daily through instant messages or phone calls. However, the results show that biased beliefs and the ability to strategically misreport information persist despite these significant improvements in communication technology. Addressing purposeful misreporting requires interventions that increase spouses' abilities to monitor and control each other's financial decision-making, including interventions that specifically increase communication about finances.

I also find that strategic misreporting is limited to certain subgroups of transnational households, implying that interventions to reduce strategic misreporting would be most effective when targeted to these households. Importantly, these subgroups can be identified from observable baseline characteristics of communication, monitoring, and control over financial decision-making.

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Migrant      Migrant      Migrant      Migrant      Spouse      Spouse
recruited    baseline     invited      survey      invited     survey
             survey

$N = 4125$      $N = 492$    $N = 159$    $N = 492$    $N = 156$

**Subject**          **Migrant**         **Spouse**
**pool**          **experiment**     **experiment**
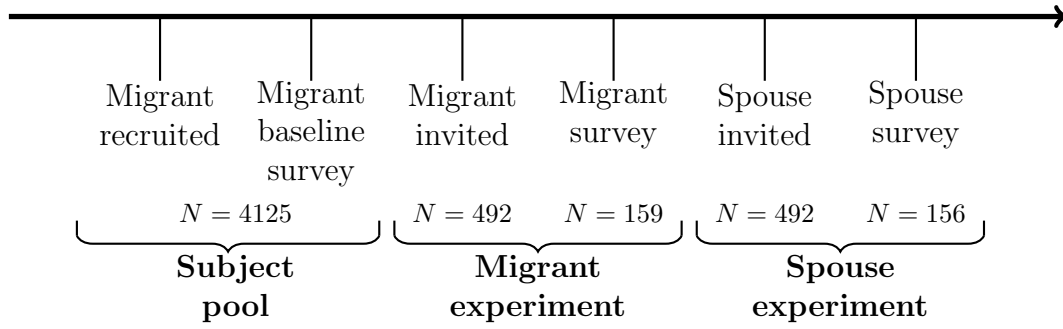
FIGURE I: PROJECT TIMELINE

FIGURE II: MONTHLY REMITTANCES AGAINST NET INCOME

Panel A: Migrant's Net Income

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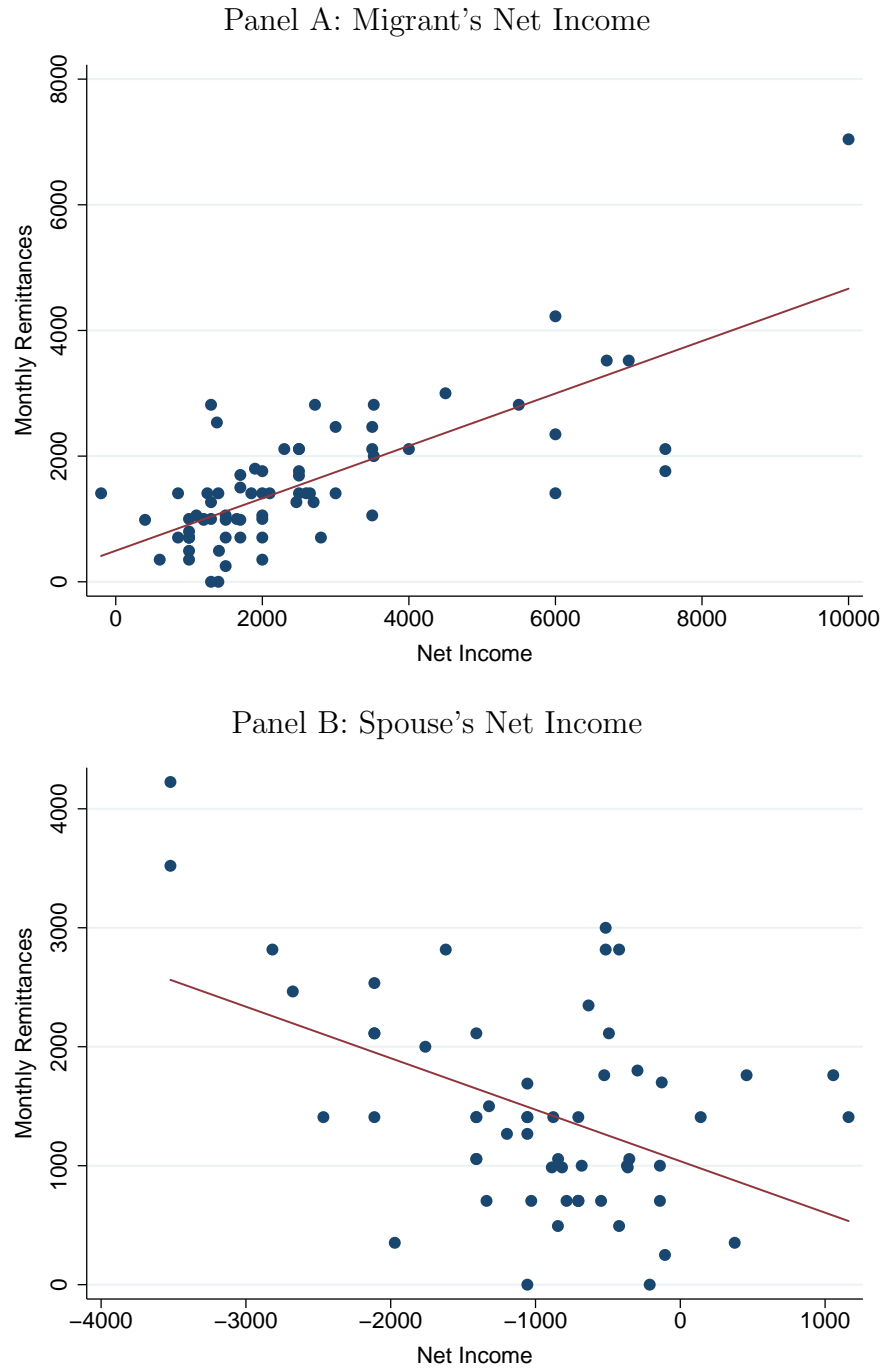
**Notes:** The figure shows scatter plots and linear regression lines for the control group. Remittances are measured in dirhams per month and were reported in the migrant baseline survey. Net income is reported monthly income net of reported monthly expenses, measured in dirhams. Panel A shows the relationship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

Panel A.I: Migrant's Income and Expenses

Panel A.II: Migrant's Non-wage Benefits

Panel B: Spouse's Income and Expenses
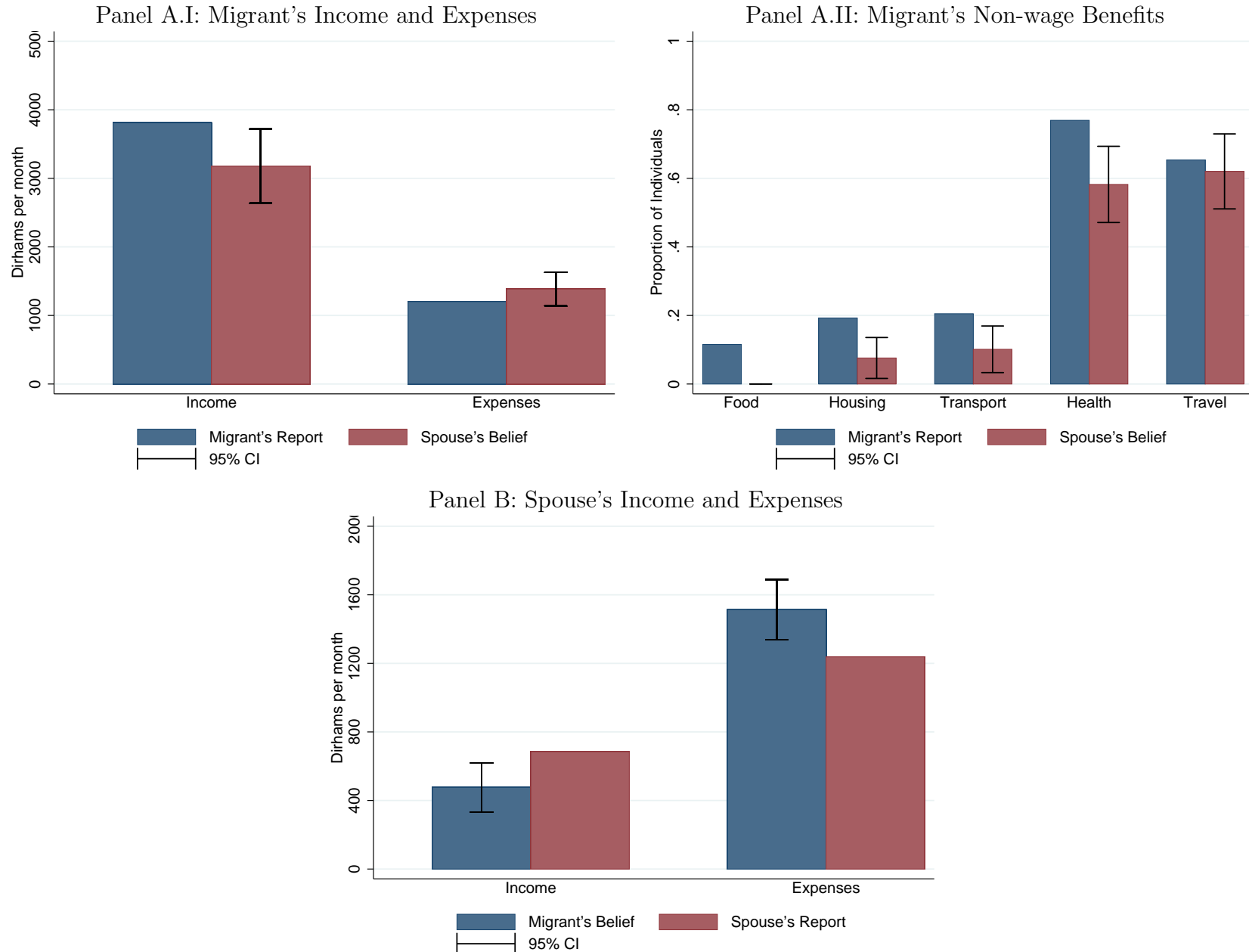
FIGURE IV: CUMULATIVE DISTRIBUTION OF REPORTED INCOME

Panel A: Spouse's Income



Panel B: Migrant's Income
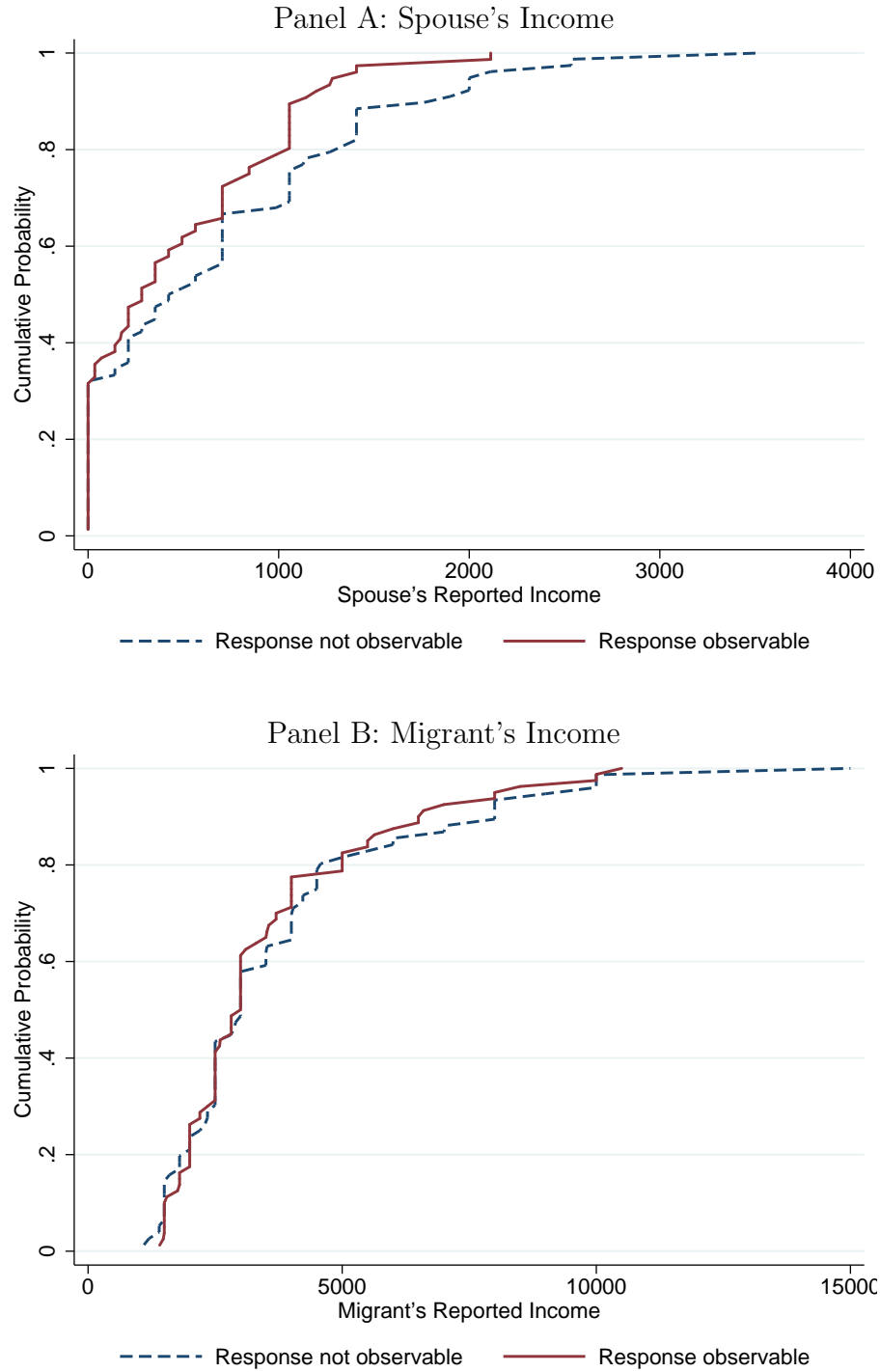


**Notes:** Panels A and B plot the empirical cumulative distribution of the spouse's and migrant's reported incomes, respectively.

## 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) |
| **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) |
| $N$ | 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 (3) | p-val (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)** |
| | | | | |
| N | 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** | -249.8** | -85.78 | -95.00 |
| | (104.5) | (114.0) | (101.4) | (93.35) |
| | [0.045] | [0.027] | [0.399] | [0.331] |
| Spouse is male | | 131.1 | | -324.6*** |
| | | (114.1) | | (111.8) |
| Migrant's monthly remittances to spouse | | -0.0711 | | 0.0443 |
| | | (0.0652) | | (0.0843) |
| Migrant's remittance: Above median | | -151.0 | | 74.92 |
| | | (170.8) | | (171.5) |
| Migrant wants more control over remittance spending | | 4.704 | | -3.092 |
| | | (133.5) | | (120.9) |
| Migrant instructs spouse about remittance spending | | -210.8 | | -4.754 |
| | | (135.4) | | (127.3) |
| Migrant discusses budget with spouse: Frequency above median | | -5.847 | | -53.18 |
| | | (130.3) | | |
| Mean when response not observable to migrant | 684.8*** | | 1,238*** | |
| | (85.89) | | (77.93) | |
| Observations | 154 | 154 | 152 | 152 |
| R-squared | 0.026 | 0.121 | 0.005 | 0.266 |

**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 | -190.1 | 72.89 | 41.38 |
| | (379.3) | (212.8) | (132.7) | (98.27) |
| | [0.521] | [0.418] | [0.584] | [0.674] |
| | | | | |
| Migrant is male | | 428.3** | | -49.78 |
| | | (215.7) | | (93.83) |
| Migrant's monthly remittances to spouse | | 0.641* | | 0.137 |
| | | (0.352) | | (0.122) |
| Migrant's remittance: Above median | | -418.1 | | -179.5 |
| | | (509.1) | | (196.9) |
| Migrant wants more control over remittance spending | | -292.5 | | -133.3 |
| | | (247.3) | | (106.3) |
| Migrant instructs spouse about remittance spending | | 490.6* | | 122.6 |
| | | (270.6) | | (104.0) |
| Migrant discusses budget with spouse: Frequency above median | | 440.8* | | -12.41 |
| | | (255.4) | | (119.3) |
| Years since migrant last visited spouse | | -63.06 | | 19.15 |
| | | (60.47) | | (26.12) |
| | | | | |
| Mean when response not observable to spouse | 3,809*** | | 1,201*** | |
| | (296.5) | | (97.07) | |
| Observations | 155 | 155 | 156 | 156 |
| R-squared | 0.003 | 0.709 | 0.002 | 0.581 |

**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 and dummies for participation and treatment status in accompanying experiment in the appendix. Monthly remittances are measured in dirham.

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

|  | Income | | Expenses | |
|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) |
| Response observable to migrant | -309.6** | -248.6** | -19.73 | -26.20 |
|  | (120.3) | (119.5) | (123.4) | (111.9) |
|  | [0.013] | [0.089] | [0.878] | [0.833] |
| Spouse is male |  | 101.8 |  | -213.7 |
|  |  | (127.3) |  | (143.2) |
| Migrant's monthly remittances to spouse |  | -0.0799 |  | 0.307** |
|  |  | (0.152) |  | (0.139) |
| Migrant's remittance: Above median |  | 90.84 |  | -182.1 |
|  |  | (296.8) |  | (256.5) |
| Migrant wants more control over remittance spending |  | -139.3 |  | -61.51 |
|  |  | (174.6) |  | (180.4) |
| Migrant instructs spouse about remittance spending |  | 15.43 |  | -20.05 |
|  |  | (164.0) |  | (181.4) |
| Migrant discusses budget with spouse: Frequency above median |  | -157.7 |  | 86.78 |
|  |  | (179.3) |  | (157.5) |
| Mean when response not observable to migrant | 670.3*** |  | 1,124*** |  |
|  | (102.6) |  | (96.16) |  |
| Observations | 93 | 93 | 91 | 91 |
| R-squared | 0.065 | 0.188 | 0.000 | 0.266 |

**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 remittances are measured in dirham.

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

| | Income | | Expenses | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Response observable to spouse | -254.6 | -360.0 | -9.991 | -104.9 |
| | (438.9) | (297.4) | (161.2) | (150.2) |
| | [0.562] | [0.174] | [0.953] | [0.411] |
| | | | | |
| Migrant is male | | 422.5 | | 0.338 |
| | | (267.9) | | (116.5) |
| Migrant's monthly remittances to spouse | | 0.166 | | 0.0874 |
| | | (0.299) | | (0.231) |
| Migrant's remittance: Above median | | 325.6 | | 49.92 |
| | | (485.4) | | (272.5) |
| Migrant wants more control over remittance spending | | -137.8 | | -191.9 |
| | | (345.9) | | (149.8) |
| Migrant instructs spouse about remittance spending | | 102.9 | | 125.8 |
| | | (310.7) | | (139.1) |
| Migrant discusses budget with spouse: Frequency above median | | 782.0** | | 149.1 |
| | | (347.1) | | (162.4) |
| Years since migrant last visited spouse | | 17.19 | | 48.49* |
| | | (51.81) | | (24.82) |
| | | | | |
| Mean when response not observable to spouse | 3,697*** | | 1,207*** | |
| | (311.8) | | (110.5) | |
| Observations | 94 | 94 | 94 | 94 |
| R-squared | 0.004 | 0.763 | 0.000 | 0.574 |

**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 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** | -0.544*** | -0.0604 | -0.0795 |
| | (0.177) | (0.181) | (0.106) | (0.104) |
| | [0.009] | [0.003] | [0.568] | [0.446] |
| Spouse is male | | 0.143 | | -0.315** |
| | | (0.199) | | (0.125) |
| Migrant's monthly remittances to spouse | | 0.000409** | | 0.0000241 |
| | | (0.000163) | | (0.0000647) |
| Migrant's remittance: Above median | | -0.897** | | 0.102 |
| | | (0.387) | | (0.145) |
| Migrant wants more control over remittance spending | | 0.367 | | -0.0601 |
| | | (0.233) | | (0.127) |
| Migrant instructs spouse about remittance spending | | -0.484** | | -0.0224 |
| | | (0.206) | | (0.115) |
| Migrant discusses budget with spouse: Frequency above median | | -0.0657 | | -0.0381 |
| | | (0.222) | | (0.110) |
| Mean when response not observable to migrant | 6.639*** | | 6.945*** | |
| | (0.110) | | (0.0733) | |
| Observations | 105 | 105 | 152 | 152 |
| R-squared | 0.062 | 0.246 | 0.002 | 0.215 |

**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: SPOUSE'S REPORTED INCOME: HETEROGENEOUS TREATMENT EFFECT

| | (1) | Communication & Control | | | Remittance Behaviour | | Gender |
| | | Control (2) | Instruct (3) | Budget (4) | Amount (5) | Median (6) | Male (7) |
|---|---|---|---|---|---|---|---|
| Treatment | -249.8** | -572.7*** | -576.1*** | -597.7*** | -368.9** | -195.8 | -323.3** |
| | (114.0) | (148.0) | (187.8) | (196.1) | (181.6) | (138.3) | (148.7) |
| | [0.027] | [0.000] | [0.003] | [0.003] | [0.049] | [0.152] | [0.032] |
| Treat x Trait | | 721.5*** | 579.7** | 525.9** | 0.0846 | -162.0 | 221.0 |
| | | (203.8) | (226.9) | (227.0) | (0.0936) | (227.9) | (212.0) |
| | | [0.001] | [0.014] | [0.031] | [0.384] | [0.521] | [0.320] |
| Treatment + (Treat x Trait) | | 148.7 | 3.549 | -71.75 | -368.8 | -357.8* | -102.3 |
| | | (151.3) | (129) | (128.1) | (181.5) | (188.3) | (157.3) |
| | | [0.332] | [0.979] | [0.585] | [0.049] | [0.063] | [0.518] |
| Controls | Y | Y | Y | Y | Y | Y | Y |
| Observations | 154 | 154 | 154 | 154 | 154 | 154 | 154 |
| R-squared | 0.121 | 0.187 | 0.163 | 0.154 | 0.125 | 0.124 | 0.127 |

**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. Male is a dummy equal to one if the spouse is male. 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 IX: MIGRANT'S REPORTED INCOME: HETEROGENEOUS TREATMENT EFFECT

| | (1) | Communication & Control | | | Remittance Behaviour | | Gender |
| | | Control (2) | Instruct (3) | Budget (4) | Amount (5) | Median (6) | Male (7) |
|---|---|---|---|---|---|---|---|
| Treatment | -190.1 | -52.08 | -595.0* | -516.5 | 905.9** | 231.5 | -575.8** |
| | (212.8) | (366.0) | (353.5) | (481.7) | (401.9) | (217.9) | (287.0) |
| | [0.418] | [0.888] | [0.120] | [0.264] | [0.093] | [0.328] | [0.053] |
| Treat x Trait | | -300.4 | 711.4* | 499.8 | -0.770** | -1,304** | 656.1 |
| | | (475.3) | (415.3) | (547.8) | (0.299) | (577.6) | (423.7) |
| | | [0.495] | [0.141] | [0.344] | [0.046] | [0.021] | [0.141] |
| Treatment + (Treat x Trait) | | -352.4 | 116.4 | -16.70 | 905.1 | -1072** | 80.31 |
| | | (250.5) | (246.8) | (226.1) | (401.7) | (508.4) | (302.8) |
| | | [0.164] | [0.687] | [0.945] | [0.093] | [0.038] | [0.807] |
| Controls | Y | Y | Y | Y | Y | Y | Y |
| Observations | 155 | 155 | 155 | 155 | 155 | 155 | 155 |
| R-squared | 0.709 | 0.709 | 0.714 | 0.711 | 0.734 | 0.724 | 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. 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. Male is a dummy equal to one if the migrant is male. 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.

| | (1) | (2) | (3) | |
|---|---|---|---|---|
| | Men | Women | Difference | |
| | | | Mean | p-val |
| **Demographics** | | | | |
| Age | 38.49 | 36.20 | -2.29 | (0.05)* |
| Children | 2.12 | 2.05 | -0.07 | (0.73) |
| Income range (AED/month) | | | | |
|   Less than 1,500 | 0.05 | 0.11 | 0.06 | (0.18) |
|   1,500 - 3,000 | 0.23 | 0.39 | 0.16 | (0.04)* |
|   3,000 - 4,500 | 0.31 | 0.26 | -0.04 | (0.55) |
|   4,500 - 6,000 | 0.13 | 0.03 | -0.10 | (0.02)* |
|   6,000 - 7,500 | 0.03 | 0.07 | 0.03 | (0.34) |
|   7,500 - 9,000 | 0.04 | 0.05 | 0.01 | (0.81) |
|   9,000 - 10,000 | 0.01 | 0.02 | 0.01 | (0.75) |
|   Greater than 10,000 | 0.09 | 0.02 | -0.08 | (0.03)* |
| Occupation | | | | |
|   Services | 0.16 | 0.18 | 0.02 | (0.78) |
|     Food Services | 0.14 | 0.02 | -0.13 | (0.00)** |
|     Personal Services | 0.02 | 0.16 | 0.14 | (0.01)** |
|   Sales | 0.11 | 0.15 | 0.04 | (0.53) |
|   Construction & Maintenance | 0.18 | 0.05 | -0.13 | (0.01)** |
|   Administration | 0.05 | 0.11 | 0.06 | (0.18) |
| **Monitoring and Control** | | | | |
| Years in UAE | 7.32 | 5.95 | -1.37 | (0.08) |
| Years since last visit | 2.02 | 1.48 | -0.54 | (0.04)* |
| Visits per year | 0.73 | 0.74 | 0.00 | (0.96) |
| Relatives in UAE | 2.40 | 3.13 | 0.73 | (0.24) |
| Spouse HH members | 3.49 | 2.97 | -0.52 | (0.07) |
| Spouse lives with In-laws | 0.27 | 0.34 | 0.07 | (0.37) |
| Discuss budget per monthy | 0.53 | 0.61 | 0.08 | (0.31) |
| Want more control of spending | 0.36 | 0.58 | 0.22 | (0.01)** |
| Instruct spouse on spending | 0.50 | 0.70 | 0.20 | (0.01)* |
| **Remittance Behavior** | | | | |
| Spouse is main recipient | 0.99 | 1.00 | 0.01 | (0.32) |
| Other recipients | 1.14 | 1.25 | 0.10 | (0.64) |
| Remit monthly | 0.91 | 0.91 | -0.01 | (0.91) |
| Remittance (AED/month) | 1700.63 | 1173.48 | -527.15 | (0.00)** |
| *N* | 98 | 61 | | |

**Notes:** Columns (1) and (2) show means for male and female migrants who participated in the study, respectively. Column (3) shows the difference of means between male and female migrant participants. Column (4) 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 a 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 consumptions 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 the migrant remits the minimum amount such that the spouse will accept and the spouse requires a minimum compensating utility of $(\bar{U}_S)$ based on their expected consumption and services $(\bar{U}_S(\bar{c}_S, \bar{h}))$. The spouse then accepts a remittance amount 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 $r = r(y_S)$ and the

implicit function theorem therefore implies:

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

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 de 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:

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

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 participate 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 participants 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.

# A.IV  Appendix Tables

TABLE A.I: MIGRANT BASELINE SUMMARY STATISTICS OF PARTICIPATING SPOUSES: 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 | 0.49 | (0.73) | 1.00 | 0.00 | |
| Spouse participated | | 0.61 | | 0.58 | 0.63 | (0.50) |
| **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) |
| $N$ | 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 | -0.0285 | 0.119 | 0.102 |
| | (0.0876) | (0.0512) | (0.124) | (0.110) |
| | [0.743] | [0.599] | [0.339] | [0.318] |
| Migrant is male | | 0.122** | | -0.0235 |
| | | (0.0572) | | (0.110) |
| Migrant's monthly remittances to spouse | | 0.00008* | | 0.000012 |
| | | (0.00005) | | (0.00069) |
| Migrant's remittance: Above median | | 0.0376 | | 0.0481 |
| | | (0.0896) | | (0.151) |
| Migrant wants more control over remittance spending | | -0.0466 | | -0.188* |
| | | (0.0579) | | (0.113) |
| Migrant instructs spouse about remittance spending | | 0.0385 | | 0.178* |
| | | (0.0615) | | (0.101) |
| Migrant discusses budget with spouse: Frequency above median | | 0.111* | | -0.0412 |
| | | (0.0631) | | (0.121) |
| Years since migrant last visited spouse | | -0.0168 | | 0.0237 |
| | | (0.0186) | | (0.0237) |
| Mean when response not observable to spouse | 8.068*** | | 6.814*** | |
| | (0.0664) | | (0.0946) | |
| Observations | 155 | 155 | 156 | 156 |
| R-squared | 0.001 | 0.696 | 0.006 | 0.489 |

**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.