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What did they say? Respondent identity, question framing, and the measurement of employment

Rosa Abraham,[1] Nishat Anjum,[2] Rahul Lahoti,[3] and Hema Swaminathan[4]

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Abstract: Drawing from two labour market experiments in rural India, we offer insights on the influence of survey design on the measurement of employment. The first experiment contrasts self-reported estimates of employment with proxy-reported estimates from spouses. We find that employment estimates based on reports by men underestimate women's employment by six percentage points compared to estimates from women themselves. There are significant differences in the types of employment activities reported by self and proxy. These divergences emanate from asymmetric measurement errors, stemming from gender-based norm disparities and divergent interpretations of employment and information asymmetry between spouses concerning marginal activities. The second experiment investigates if framing of questions and recall period has an impact on reporting labour market outcomes. We find that using multiple questions to probe about weekly employment status results in a 10-percentage-point-higher estimate of employment for women compared to a single question about their major activity.

Key words: proxy response, survey design, gender, labour force participation, India

JEL classification: J16, J21, J20

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[1] Azim Premji University, Bengaluru, India, rosa.abraham@apu.edu.in; [2] Jawaharlal Nehru University, Delhi, India; [3] UNU-WIDER, Helsinki, Finland; [4] Asian Development Bank, Manila, Philippines and Indian Institute of Management, Bangalore, India.

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Katajanokanlaituri 6 B, 00160 Helsinki, Finland

1 Introduction

> *A great deal of information on women exists, but it frequently comes from questions asked of men about their wives, daughters, and sisters, rather than from the women themselves...What women do is perceived as household work and what they talk about is called gossip, while men's work is viewed as the economic base of society and their information is seen as important social communication* (Reiter 1975).

Accurately knowing the extent and type of women's role in economic activities is key to understanding their contribution to the economy and helps design appropriate economic and labour market policies. However, measuring women's employment in the Global South faces many challenges. In predominantly informal economies, women typically engage in multiple activities throughout the day, spanning both paid and unpaid work. Further, women's work tends to be fragmented, concentrated in the informal sector, and home-based to a great degree. These characteristics potentially lead to ambiguity regarding whether women are involved in economic activities. Besides these attributes unique to women's work and employment, the structure and protocol of standard labour force surveys may lead to under-reporting and under-valuation of women's work and their contribution to the economy (Dixon-Mueller and Anker 1988; Greenwood 2000).

The measurement literature (see Kilic et al. (2022) and Koolwal (2021) for a review) argues that (i) the boundaries of work, as conceptualized by labour statistics, do not include many productive economic activities that tend to be predominantly performed by women (Deshpande and Kabeer 2024); (ii) how the question of work is framed including the reference period used fails to capture marginal and multiple activities that women engage in (Koolwal 2021); and (iii) the household respondent, who typically gives information for all members, may not present an accurate picture of the extent and type of women's work (Dervisevic and Goldstein 2023). Thus, a clear conceptualization of women's work is missing, compounded by the difficulties of operationalizing these concepts.

In our country of focus, India, the burgeoning literature on women's low labour force participation rates has typically dwelt on the supply-side and demand-side factors, although recently, measurement issues have garnered attention (Hirway 2010, 2015; Deshmukh et al. 2020; Deshpande and Kabeer 2024; Kapur et al. 2021). In the measurement discussions, while much has been written about women's paid and unpaid work and definitions of economic activities, far less attention has been paid to the role of proxy informants and framing of questions in labour estimates. Standard labour surveys, in most instances, rely on a single respondent to provide information on all household members and ask single 'keyword'-based questions to determine the work status of individuals. Not speaking to women themselves about their activities, coupled with gendered norms of roles and responsibilities and inadequate calling out of various activities in the questions, poses a challenge to measure women's employment accurately (Benes and Walsh 2018; Koolwal 2021; Kilic et al. 2022; Kapur et al. 2021).

In this paper, we use data from a unique survey, the India Working Survey 2020 (IWS), which was conducted in two states of India to examine the impact of methodological variations in survey design on labour market outcomes of men and women. Specifically, the study uses survey experiments to

investigate the effect of the identity of respondents and framing of questions on the measurement of employment of men and women. We use the conceptual framework by Ambler et al. (2021) to hypothesize mechanisms driving the measurement errors arising from proxy reporting and the framing of questions. We further empirically test the hypothesis using survey experiments.

We conduct two survey experiments. In the self-proxy survey experiment, we compare responses on labour market status questions of spousal pairs when they report about themselves as well as their spouse. We estimate the differences in reporting of a range of labour market outcomes when self-reported compared to proxy-reported. In the framing survey experiment, households are randomly administered one of three types of survey instruments, with each instrument varying either in the detail of questions asked or in the reference period for employment activities.

In the self-proxy experiment, we find that respondent identity plays a role in measuring employment with differential effects for men and women. The women's participation rate, as reported by men, i.e. proxy reported, is six percentage points lower than that reported by women themselves. For men, there is no significant difference between self- and proxy-reported estimates. We disaggregate overall employment into different types of employment. Compared to women's self-estimates, men report a higher proportion of women in self-employment and a lower proportion in wage and contributing family work. On the other hand, women are more likely to identify men as participating in wage work, while men are more likely to report themselves in self-employment or contributing to family work.

Based on our conceptual framework and intra-household analysis of reporting differences, we reject the hypothesis that self-proxy reporting differences are only due to random measurement error. We find that asymmetric measurement error (differential gender norms and understanding the definition of work activities) and information asymmetry (strategic or unintentional) play a key role in the self-proxy differences in reporting.

In the framing experiment, detailed questions asking specifically about each kind of employment, rather than a single weekly question, increase women's employment rate by 10 percentage points while having no discernible difference in men's employment rate. Most of the change in women's employment comes from an increase in the share of women reporting unpaid family work. Similarly, moving from asking one question about the week to asking one question about each day of the week (single weekly versus single daily) increases women's employment estimates by about seven percentage points and men's by four percentage points.

Our paper makes contributions to different strands of the literature. First, we contribute to the literature on survey methodology that deals with who should be interviewed in household surveys. There have been mixed results on whether and to what extent respondent identity matters (Bardasi et al. 2011; Dervisevic and Goldstein 2023; Kilic et al. 2022). We show that in the Indian context the respondent's gender identity matters in the estimates of labour market outcomes. In addition, and unlike other studies on the topic, we find that the deviation in self and proxy reports vary by the type of employment activity that individuals are engaged in.

Second, our survey design allows us to combine household and individual attributes to understand the sources for the measurement error in labour outcomes. We show that error is not random but driven by a differential understanding of work, differential gender norms, and asymmetry of information between the respondents. Only a few recent studies have investigated these mechanisms and not necessarily in the context of labour estimates (Sharma et al. 2024; Ambler et al. 2021).

Finally, in terms of question framing, the study answers separately to what extent reference period and detailed questions impact measures of employment and what kinds of work are most likely to be mismeasured. While the question has been examined in the Indian context (Deshmukh et al. 2020; Deshpande and Kabeer 2024), the survey design in our study allows us to examine the causal impact of these changes on employment estimates.

Section 2 reviews the literature on measurement and labour market outcomes. Section 3 describes the conceptual framework. Section 4 discusses the survey instrument used in the IWS and the two survey experiments. Section 5 discusses the findings from proxy- versus self-reported employment estimates, while Section 6 shares the findings from the framing of questions and their impact on employment estimates. Section 7 concludes.

2 Literature review

2.1 Measurement error: self vs proxy reporting

Obtaining information from one member about all household members, or proxy reporting, is a standard feature of most national surveys.[1] Across several countries, studies have examined the differences in self and proxy reporting of various outcomes including employment estimates (Bardasi et al. 2011; Dervisevic and Goldstein 2023; Kapur et al. 2021), child labour estimates (Galdo et al. 2021; Dillon et al. 2012), land and other asset ownership (Ambler et al. 2021; Joshi et al. 2022; Kilic et al. 2022), household and agricultural decision making (Ambler et al. 2021; Twyman et al. 2015), income (Fisher et al. 2010), and time use (Sharma et al. 2024). These studies confirm that mismatch between proxy and self-reports varies with both the identity of the person providing the information as well as the identity of the person for whom information is being sought.

The evidence on how the identity of the respondent affects labour estimates is not conclusive and, not surprisingly, is dependent on the geographical context and the type of employment activity. Bardasi et al. (2011) examine the impact of proxy responses on measurement of men's and women's employment in Tanzania. The authors find that men's employment is sensitive to respondent identity with women under-reporting men's work. The reporting of women's work by a male proxy had no significant deviation from self-reports. Kilic et al. (2022) in Malawi find that proxy estimates are lower than self-reported estimates for men and women across various employment activities. More recently, Dervisevic and Goldstein (2023) find that in Ghana, self-reporting by male workers is less reliable than proxy reporting

[1] There are some exceptions, for instance when questions deal with specific and/or sensitive data such as reproductive health or violence.

by their spouses if their work is seen as violating gender norms. In the Indian context, the only study, to the best of our knowledge, that indirectly addresses the self versus proxy question is by Kapur et al. (2021) in the context of select urban clusters. They find that inconsistencies in the reporting of work is significantly reduced when women respond to roster questions compared to when men respond. In general, according to them, proxy reporting by women results in fewer reporting errors.

2.2 Measurement error: questionnaire design

The framing of questions can have significant impacts on the measurement of employment, particularly in economies dominated by agriculture characterized by seasonality and inherent multiplicity of activities (Dixon 1982). Given women's roles in agriculture, these issues will have much larger implications for the measurement of women's employment.

Question framing can vary in terms of the phrases used to identify the outcome being measured, the recall or reference period used, and the level of detail in the question being asked. Questions having a 'list of activity' approach tend to provide higher estimates of women's employment compared to 'keyword' questions, i.e. questions that contain a typically recognizable keyword about overall employment such as 'main activity', 'secondary activity', and 'pay or profit' (Anker 1983; Langsten and Salen 2008). Bardasi et al. (2011) estimate differences in labour statistics comparing a short module questionnaire versus a longer module in the context of Tanzania. The short module consists of one question on work—'Did you do any type of work in the last seven days?' The detailed module consists of screening questions specifying three main groups of economic activity. Comparing employment rates across these two instruments, they find that in the short module a higher share of women and men reported as working compared to the detailed module. However, after re-classifying domestic work as 'no work', women's employment is about five percentage points lower in the short module than in the detailed module. The seven-day or one-week reference period has been more or less universally accepted as good practice and has been found to minimize recall errors. Finally, Benes and Walsh (2018) emphasize the importance of asking recovery questions. They find that unpaid family work is particularly likely to be reported as unemployed in the absence of recovery questions. Similarly, Discenza et al. (2021) find that adding follow-up recovery questions helps minimize recall error.

In the Indian context, Deshmukh et al. (2020) reiterate the findings of Anker (1983). The study finds that asking about primary and secondary activities, analogous to the 'keyword' questions identified in Anker (1983), results in a higher share of women being listed as homemakers. In contrast, follow-up questions on the major sources of household income and who contributed to this income results in much higher estimates of women's employment participation, with a large share of this increase coming from the reporting of women's work in caring for livestock. Deshpande and Kabeer (2024) find that many women engage in 'expenditure-saving' activities that are often not counted as employment unless specific follow-up questions are asked to women who identify as primarily out of the workforce.

In this paper, we compare employment rates across three treatment arms—detailed weekly, short weekly, and short daily—with each varying in terms of the level of detail in the question or the reference period used. The detailed weekly asked separate questions with each calling out a list of activities, while the short weekly and short daily ask a single keyword-based question. Additionally, we also explore the

impact of a change in reference period by comparing the short weekly, which asks a single question about the last week, with the daily weekly, which asks about each day of the last week.

3 Conceptual framework

Household surveys typically collect data by eliciting responses from one or more individuals within the household. Measurement error is inherent in this process and refers to the difference between the true (unknown) value of the characteristic being collected and the value recorded in the survey (UN 2005). Groves (2005) and Biemer and Lyberg (2003) document four main sources of non-sampling errors, namely:

(i) Respondents: Respondents might answer differently from the true value due to different interpretations of the questions, lack of information, norms-based biases, or lack of effort.

(ii) Questionnaire: The design of the survey instrument including the wording and ordering of questions can cause deviations from true values.

(iii) Data-collection method: The mode of data collection, whether in person, on the phone, or online, can affect survey responses.

(iv) Interviewers: Enumerator-specific attributes including their gender, caste or race, and skills and biases may affect responses.

In this paper, we investigate the first two sources of measurement error, i.e. respondents and the questionnaire.

3.1 Measurement error due to respondent

Respondent-led measurement error may occur as a result of the identity of the respondent, differences in conceptual understanding of the question being asked, and social desirability bias. This is likely to be exacerbated when respondents report on behalf of others. Here, we focus on the explanations for why self and proxy reports on labour outcomes by husbands and wives might differ. Based on the framework proposed by Ambler et al. (2021), we classify respondent-led error into three categories: random measurement error, asymmetric measurement error, and asymmetric information error. Further, we present testable predictions that can differentiate between these explanations for measurement error.

Random measurement error

Random measurement error refers to self-proxy discrepancies that are unrelated to individual or household attributes and do not systematically differ between men and women. Such errors may arise caused by a number of reasons unrelated to the self or proxy identity such as enumerator characteristics. If measurement error is indeed random, there would be no systematic deviation in the self and proxy responses for men and women.

This implies that the likelihood of women's (men's) employment being reported higher or lower by their husbands (wives) compared to what they report is equally likely. Consequently, the overall employment estimate from proxy reports would be similar to the estimates from self-reports. Respondent identity (whether husband or wife) has no bearing on estimates of employment. This leads us to our first testable prediction:

Prediction 1: *If random measurement error is the only factor leading to differences in reporting, then either type of deviation between self and proxy, i.e. under- or over-reporting, should occur with equal probability.*

Asymmetric measurement error

Asymmetric measurement error, on the other hand, leads to responses that systematically differ between men and women. In the context of employment, asymmetric measurement errors may stem from two sources—differences in the definitional understanding of what constitutes employment and gender-norms-based differences in identifying employment. First, the understanding of employment for men and women may differ, even though there is complete information on activities performed by either within the household. For instance, men may consider employment to involve only paid labour, while women may also include their work on the family farm, which is often not explicitly remunerated. Muller and Sousa (2020) show that rural female labour force participation in Honduras is underreported due to women primarily recognizing themselves as 'housewives', although they are engaged in 'economic' activities besides household work. Women were more stringent in applying the definition of employment, characterizing it as work done, for example, in exchange for money or performed outside the home, while men did not identify such constraints in defining employment. Such gendered discrepancies in the understanding of employment leads to difference in estimates between self and proxy reports.

Second, social norms that assign specific roles to men and women also influence reporting by sex. Since women are primarily recognized as homemakers, their economic identity is often not recognized by proxy respondents (Comblon et al. 2017). Women, in keeping with the male breadwinner norm, may hesitate to report men as unemployed. Even when men and women do not conform to these prescribed roles themselves, their proxies, for various reasons, may report in line with social norms. The reporting of women's employment by men may be driven by perceived social censure associated with a certain activity (Jayachandran 2021). In India, where a woman working outside the home is often considered a symbol of low social status, men may be averse to reporting their wives being employed. Bernhardt et al. (2018) find that while men themselves are open to their wives being employed, their 'second-order' beliefs about what society expects results in men reporting disapproval of women being in employment. Thus, social norms potentially shape both the understanding and the reporting of employment by men and women. Since norms and definitional clarity can vary across different types of employment, the extent of asymmetric measurement error may also vary by employment type. This leads us to our second testable prediction:

Prediction 2: *When asymmetric measurement error exists, overall reporting differences between husband and wife should vary as the probabilities of disagreements (between self and proxy) vary. We expect the*

disagreements to vary across employment activities due to differential interpretation of employment or/and differential gender norms.

We expect disagreements to be higher in activities such as contributing to family work. The fuzzy boundary between contributing to work, self-employment, and not being employed can lead to asymmetric measurement error.

Asymmetric information error

Asymmetric information error arises when there is incomplete information pooling between spouses. This could be intentional if spouses strategically hide information about their activities from each other to keep income private or avoid censure if they are going against social norms. Information asymmetry could also be unintentional due to issues of observations (spouses could be employed in different locations) or gendered domains of responsibility.

If the employment activity is marginal, intermittent, and/or performed simultaneously with other activities—taking care of livestock or contributing to the family farm—it is more likely to be overlooked by the proxy respondent. Employment activities that are more visible and consistent such as wage work are less likely to be hidden. If the individual engages in the same activity for the majority of the year, then proxies are more likely to attribute that activity to the individual in the week of the survey irrespective of what they were actually doing in the reference period being asked about. This leads us to our final testable prediction:[2]

Prediction 3: *Information asymmetry, either strategic or unintentional, leads to variation in the probability of overall disagreement by activity type between self and proxy reporting.*

In the empirical analysis of measurement error, it is not possible to completely disentangle between asymmetric measurement error and asymmetric information error. However, the mechanisms through which these errors operate differ, and by identifying suitable indicators (discussed in Section 5.1) to capture these mechanisms, we are able to establish potential channels for self-proxy mismatches.

3.2 Measurement error due to questionnaire

Like respondent-led error, questionnaire-based error may be random or may be systematically related to the employment activities and/or the identity of the individual to whom or about whom questions are being asked. Social norms prescribe certain primary identities for individuals—women as homemakers and men as breadwinners. These identities often affect the reporting of activities even when self-reported since they take precedence in an individual's mind and influence what they report themselves as, irrespective of what they actually do. The framing of questions, particularly the level of details asked and extent of probing, can help reduce mismeasurement. Further, activities done intermittently, informally, and/or over a shorter duration are often not reported by individuals. The use of wide reference periods

[2] The mathematical modelling of all three predictions are presented in Appendix A.

can lead to under-reporting of certain marginal or sporadic activities. Therefore, different frames of reference can result in systematic measurement error in the reporting of certain activities.

4 Data and survey experiments

The survey experiments used in this analysis are embedded within a larger study, the IWS that was conducted in early 2020 across two states, Karnataka (southern India) and Rajasthan (western India).[3] In addition to labour market outcomes, IWS collected information on diverse domains, including household living standards, wages, time spent on household production activities, occupational life history, decision-making, social networks, and experiences of discrimination. The IWS followed a stratified multistage sampling design and intended to survey approximately 4,000 households in each state, which would have provided a state representative sample. However, the survey was disrupted in March 2020 due to COVID-19, yielding a final (non-representative) sample of 3,646 households and 5,951 individuals (3,371 women and 2,580 men) across the two states. Our sample is restricted to rural areas that account for 85 per cent of the interviewed households. The sample is relatively evenly distributed between the two states.[4] In the next section, we describe the two methodological experiments embedded in the IWS survey design.

4.1 Self-proxy experiment design

In most countries, including India, household surveys collect information on the entire household from a single household member—usually the head or the individual who is available at the time of enumeration. IWS followed an alternative strategy. In every household, one adult man and one adult woman were randomly selected as respondents. The respondents were matched with enumerators of the same gender, and to the extent possible, the interviews were conducted privately.

We conducted the self-proxy experiment if the selected respondents were a couple. Each respondent was asked identical questions about their own *and* their spouse's labour market participation. Specifically, five questions calling out different employment activities—wage work, self-employment, contributing to family work, small-scale production, and apprenticeships/internships—followed by a recovery question were asked with respect to the last week.[5] If they or their spouse were employed in any of the above activities, then details of the activity and hours worked were also collected. Among the 5,951 respondents in the IWS, 3,750 (63 per cent) were spousal pairs. However, due to non-participation by one or both respondents and data recording issues, the final sample for spousal pairs consists of 2,674 observations, including 1,337 husbands and 1,337 wives.[6] [7]

[3] The main aim of IWS was to investigate if and how social identities (gender, caste, and religion) interacted with various dimensions of the labour market.

[4] The survey covered 135 villages across 13 districts in the two states.

[5] Appendix Table B1 lists the questions asked.

[6] Appendix Table B2 contains details of the sample.

[7] In households with non-couple respondents, we did not collect proxy information for the other respondent. Thus, we cannot investigate how proxy responses differ from self when the proxy is a non-spouse. However, we expect that spouses are likely

4.2 Framing experiment design

The framing experiment investigates the impact of question detail and reference period on labour market participation. Three different labour modules are implemented: a short weekly module, a short daily module, and a detailed weekly module. The short weekly and short daily modules resemble those used in labour market surveys conducted by the official statistical agencies in India. In the short weekly module, respondents are asked a single question: *'In the last week, what were the activities you were doing, even if only for an hour?'* They are allowed to report multiple activities, but enumerators did not provide a specific list of potential activities. In the short daily module, while the framing of the question is the same, the reference period is the previous day. The same question is asked for each of the seven preceding days, resulting in a total of seven questions. The weekly labour market status is calculated from these seven daily questions. If they are employed even a single hour on any one day in the previous week, they are deemed as employed according to weekly status.

The detailed weekly module differs from the shorter modules in two ways. First, there is a specific question for each potential employment activity, including self-employment activities, assistance in family farms or businesses (unpaid), wage or salaried work, paid apprenticeships or internships, and small-scale production of goods or services for sale. Five questions pertaining to each one of the activities were asked, with respondents indicating 'yes' or 'no' for each activity. Second, the module includes a recovery question that probes if the respondent missed out on reporting any other income-generating activity that they were involved in. The questions in the detailed module adhere to the recommendations of the International Labour Organization (ILO) for measuring key labour market indicators (Benes and Walsh 2018) and are similar to those used in the World Bank's Living Standards Measurement Study (LSMS) surveys.[8] Across the three modules, if the respondent participated in an activity, further details regarding hours worked, industry/sector of work, and income were collected.

The framing experiment was conducted only in one of the study states, Karnataka. Every surveyed household in Karnataka was randomly assigned to one of the three labour modules. The survey instrument for all three modules collected details on household demographics and asset ownership.[9]

5 Methods

We assess the impact of who and what is asked in IWS on labour market outcomes through a two-part investigation. First, we use the self-proxy experiment to analyse the discrepancies in reported labour market outcomes between self and proxy responses for spousal pairs focusing on indicators such as labour force participation, workforce participation, unemployment rate, and hours of work. We next

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to be better informed of each other's activities than other household members. So our estimates of differences in self and proxy reporting are likely to be underestimates of the self-proxy differences obtained across non-spouse household members.

[8] For the full list of questions fielded in the different modules, refer to Table B1.

[9] The individuals who were administered the short modules were asked only about themselves and not about their spouse's employment status, unlike in the detailed weekly module. Also, the short module experiments did not include several questions related to other mandates of IWS.

investigate differences in the type of employment activity being reported by self and proxy, for men and women. We use information on individual attributes and intra-household dynamics to understand potential mechanisms that can explain self and proxy deviations. Second, we use the information from the three labour modules to analyse the impact of variation in question details and reference period on men's and women's reported employment status and activities reported.[10]

5.1 Self-proxy survey experiment

The self-proxy design, where both partners provide information about their own and their spouse's employment status, enables us to identify causal differences between self and proxy reporting. We estimate the following equation while controlling for individual (self and proxy), household, and interviewer characteristics:

$$y_i = \alpha + \beta P_i + \lambda X_i + \varphi_e + \varepsilon \tag{1}$$

Here, y_i represents various employment outcomes (e.g., labour force participation, hours of work, and type of activity) for individual i. P_i is an indicator variable denoting proxy reporting of labour market outcomes, where P_i equals 1 when the outcome is proxy-reported and 0 when self-reported. The coefficient β captures the difference between self-reported and proxy-reported labour market outcomes. X_i denotes a vector of individual and household characteristics for individual i. The characteristics include respondent-level attributes (i.e. age, education), attributes of the person being reported on (i.e. age, education, and major activity for the majority of the year), and household attributes (e.g., asset ownership, social group, and information on other members in the household). φ_e represents enumerator fixed effects, which control for idiosyncratic impacts attributed to individual enumerators. The term ε accounts for the stochastic error term, which is randomly distributed across households.

There is the possibility of omitted variable bias as unobserved characteristics of the person providing information may influence the outcomes of interest. To address this concern, we also employ an individual fixed-effects regression model:

$$y_i = \alpha + \beta P_i + \varphi_e + \gamma_i + \varepsilon \tag{2}$$

Here, instead of individual and household characteristics, we introduce individual fixed effects γ_i. These fixed effects capture the impact of all time-invariant observed and unobserved characteristics of the respondent. The regression is estimated separately for women and men.

[10] Following standard protocols, the study defines an individual as 'employed' if they report engaging in any of the following activities for at least an hour in the last week: business, including farming (own consumption and sale) or other self-employment; contributing work in the household business/farm/livestock; wage or salaried work; paid apprenticeship or internship; and small-scale production of goods and services for sale. Domestic duties, including household maintenance or care work within the household, are not considered employment.

Further, we conduct intra-household analysis to explore the determinants of disagreement between spouses on overall employment status and with respect to the specific employment category. There are two kinds of disagreements that we account for. An individual may report themselves as being employed, but the spouse may disagree. This type of disagreement is referred to as 'under-reporting'. The second type of disagreement occurs when an individual reports themselves as not being employed while their proxy reports them in employment, referred to as 'over-reporting'. We estimate separate regressions for over- and under-reporting of overall employment and of each major activity type (self-employment, contributing family work, and wage work). The disagreement equations are estimated separately for the wife and the husband.[11]

To model disagreement, we estimate the following regression equation:

$$D_i = \alpha_0 + \beta X_i + \varepsilon_i \tag{3}$$

The dependent variable D_i is binary, indicating disagreement between spouses. In the case of under-reporting, the variable D_i takes a value of one when the individual reports themselves as employed but the proxy disagrees. It takes the value zero when the proxy and self agree on the individual being employed. In estimating over-reporting, the D_i takes a value of one when the individual reports themselves as being not employed while their proxy reports them in employment. It takes the value zero if the proxy agrees with the spouse's report of not being engaged in any economic activity.

Reporting can be subject to random error, asymmetric measurement error, or asymmetric information error. We expect responses to be systematically different between men and women and across activities due to measurement and information error. If errors are random, then on average, responses ought not to differ by sex. If we find systematic differences by sex or activity type, then we can conclude that measurement error is not purely random. To identify if asymmetric measurement or information error are sources of error in the responses, we include variables in our regressions that can serve as indicators for the underlying mechanisms at work. We discuss these variables briefly here.

As discussed in the conceptual framework, asymmetric measurement error may arise due to differences in the understanding of employment between self and proxy or due to gendered norms. To capture gendered norms that affect reporting of employment, we include the employment status of the husband's mother during his childhood, as reported by the husband. Our expectation is that if his mother was employed, then the husband is more likely to be aware of the employment-related activities of his wife as he has been exposed to women who have stepped beyond the prescriptive 'caregiver or homemaker' role. A second indicator for gender norms is the spousal difference in time spent in household maintenance (cooking, cleaning, child and elderly care, and fetching water). It is reasonable to expect that a low

[11] Implicit in this conceptualization is the understanding that self reports are the 'true estimates'. Typically, convergence between self and proxy reports is taken as an indicator of reporting accuracy (Blair et al. 2004). In the absence of a third source of validation data to triangulate the different reports, we consider the self-reported estimates to be the benchmark. Hence, the terms under-reporting and over-reporting are used, taking self reports as the baseline.

difference in time spent is indicative of greater sharing of domestic duties and, thus, a willingness on the part of both men and women to step outside their gendered roles.

Mismatches in reporting may arise due to self and proxy not having access to the same kind of information about each other's activities (Ambler et al. 2021), or the nature of activities may constrain its visibility to the spouse. Husbands may travel outside the house for work while wives may be engaged in the family farm or enterprise. To account for this, we include select correlates that account for attributes of the employment activities of the individuals. For the person being reported on, we include their self-reported activity status that they were engaged in for the 'majority of the year' and the number of self-reported hours of work spent in that activity being reported in that week. This can capture whether the activity that is being reported is marginal or not. We also include spousal differences in age and educational attainment that may contribute to informational asymmetry. Additionally, the estimations control for household-level attributes including an asset index reflecting the household's asset ownership profile, the social group categorization (SC/ST, OBC, or general category), and state dummies accounting for state-specific differences. Households where in-laws or more number of members are present might lead to a lower awareness of the spouse's activities.

5.2 Framing experiment

The framing experiment aims to ascertain the impact of level of detail and reference period of questions on the reporting of labour market status. Our balance tests indicate that there might be some differences across the three experiment samples. To account for these, we employ a regression analysis, controlling for the characteristics that differ significantly across the samples. The regression model we estimate is:

$$y_i = \alpha + \beta L_i + \lambda X_i + \tag{4}$$

Here, y_i represents labour market outcomes (e.g., labour force participation, workforce participation, unemployment rate) for individual i. Depending on the outcome being studied, y_i takes the value one if the individual is in the workforce/labour force or in unemployment. L_i is an indicator variable denoting the labour module that the y_i estimate is coming from. The coefficient β compares the outcome reported in the detailed weekly and single daily module with the single weekly module. X_i denotes a vector of individual and household characteristics for individual i^{th} in household h. These control variables include factors such as respondent characteristics (age, education, major activity for the majority of the year) and household attributes (asset ownership, social group).

6 Self-proxy experiment results

The samples for the self-proxy experiment are households where the randomly selected respondents are a spousal pair and were administered the detailed weekly module. Sample characteristics are presented in Table 1. The average age of men in the sample is 43 years, while women, at an average age of 37

years, are relatively younger. Almost half the sample of women are illiterate, while only about a quarter of the men are illiterate. A significant proportion of both men and women have education below the secondary level. The majority of the sample are Hindus, accounting for approximately 95 per cent of respondents.[12] About 49 per cent of respondents belong to the Other Backward Class (OBC), 23 per cent belong to the Scheduled Caste (SC), 13 per cent belong to the Scheduled Tribes (ST), and the remaining 15 per cent belong to Other categories.[13]

The activity that individuals are involved in for the majority of the time during the last year differs substantially by gender. Women are most likely to be involved in household work (46 per cent) while men are most likely to be in self-employment (53 per cent). The incidence of salaried wage is low overall but substantially higher for men (12 per cent) than women (4 per cent). Women's main employment activity is being a contributing worker, which is unpaid work on a family farm or enterprise.

To ensure the generalizability of our findings, we compared the characteristics of the spousal pairs in this sample with all married men and women in the overall sample. The analysis reveals no significant differences between the individuals in the spousal sample and their counterparts in the overall sample. This suggests that the findings from the spousal sample can be broadly extended to other married individuals in the overall sample.[14]

[12] The survey encountered challenges in obtaining representation from Muslims due to the government's proposed Citizenship Amendment Act, which sparked protests and increased religious tensions. As a result, refusals among Muslim households were higher than anticipated.

[13] The survey collected religious affiliation and caste membership at the individual level. However, the proportion of individuals reporting a different religion or caste from their spouse is negligible.

[14] Further details can be found in Appendix B2.

Table 1: Self-proxy experiment sample

	Gender of respondent	
Characteristics	Women	Men
Age (years)	37	43
Education (%)		
Illiterate	46	25
Primary/middle	35	44
Secondary+	19	31
Religion (%)		
Hindu	98	95
Others	2	5
Social group (%)		
Scheduled Caste	26	26
Scheduled Tribe	15	14
Other Backward Caste	49	50
General	10	10
Activity type (%)		
Self-employed	11	53
Contributing worker	20	1
Salaried	4	12
Casual wage	17	25
Unemployed	0	1
Household work	46	2
State (%)		
Karnataka	52	52
Rajasthan	48	48
N	1,134	1,134

Note: the sample is only for rural areas. Activity type is defined as the activity the individual is doing for the majority of the time (more than six months) in the last year.
Source: authors' calculations based on data from the Indian Working Survey (IWS).

6.1 Employment reporting by self and proxy reports

The parameters for comparison between self and proxy reports are labour force participation rates, workforce participation rates, unemployment rates, and average working hours (Table 2). For women, several proxy-reported labour market statistics are significantly lower compared to self-reported numbers. While 69.5 per cent of women report themselves as being part of the labour force, only 63.8 per cent of women are reported as such by their husbands, indicating a significant discrepancy of 5.7 percentage points. Similar differences exist in the workforce participation rate for women. Although not statistically significant, the proportion of women reporting themselves as unemployed is higher than when reported by their husbands.[15]

Regarding unconditional working hours, which is the average working hours of all individuals regardless of their employment status, women's self-reports show significantly higher average working hours compared to proxy reports. However, when the analysis is limited to those reported as working, there is no statistically significant difference between self and proxy reports. This suggests that the differences between self and proxy reports for women occur primarily at the extensive margin, i.e. in identify-

[15] An individual is identified as unemployed if they did not engage in any of the work activities in the week and responded in the affirmative to the question of either seeking work or being available for work in the last week.

ing women as employed or not, rather than at the intensive margin, i.e. the number of hours spent on economic activity.

In contrast, no statistically significant differences exist between self-reported and proxy-reported labour market outcomes for men. Proxy reports indicate slightly higher labour and workforce participation rates for men compared to self reports, but these differences are not significant. The systematic under-reporting of women's work by men and the absence of this in the case of men's work by men indicates, as per Prediction 1, that measurement error is not random and varies by the identity of the respondent.

Table 2: Difference in self- and proxy-reported labour market outcomes

	Women			Men		
	Self	Proxy	Difference	Self	Proxy	Difference
Labour force participation rate	69.5	63.8	5.7***	79.7	81.5	-1.8
Workforce participation rate	63.2	57.9	5.4***	76.9	78.7	-1.8
Unemployment rate	9.0	6.0	3.0	3.5	2.8	0.7
Hours (unconditional)	20.2	17.7	2.5***	32.3	32.7	-0.4
Hours (conditional)	32.5	31.2	1.3	42.4	41.9	0.5

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% level for two-sided t-tests, respectively. Unconditional hours worked correspond to average weekly hours worked, averaged across all responses, irrespective of reported employment status (if not working, then they are assumed to have zero hours). Conditional hours worked corresponds to average weekly hours worked conditional on reporting as being employed. The number of observations are 1,134 men and women.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

6.2 Activity distribution by self and proxy reports

Table 3 reports the differences in activities as reported by individuals and their proxies.[16] Women's activity distribution shows significant differences when reported by themselves versus their proxies. According to self-reports, approximately 16 per cent of women identify as self-employed. However, when their husbands report on their behalf, this proportion increases to 26 per cent. Conversely, women are less likely to be reported as contributing family workers or working for wages by their husbands compared to their own reporting. While 59 per cent of women self-report as contributing workers, only 54 per cent are classified as such by their husbands, reflecting a difference of five percentage points, significant at 10 per cent. This contrast in reporting between husbands and wives regarding women's self-employment and contributing work may stem from varying perceptions of these activities. The distinction lies in the fact that self-employment involves earning direct income, whereas contributing work entails contributing to the household farm without receiving direct payment. It is possible that women classify themselves as contributing workers since they do not receive any payment for their labour. On the other hand, men may consider women to be self-employed, even if there is no explicit payment, as it is a family farm. The question of handling the revenue or proceeds from the farm by women may not arise if the norms are such that men largely control finances. Additionally, husbands tend to under-report women working for wages compared to women's own reports by around six percentage points (18 per cent versus 25 per cent), most of which is driven by differences in casual wage labour in agriculture.

[16] In the event that an individual reports multiple activities, the primary activity is taken as the activity where they spent the maximum time (measured in hours) during the week.

Although there are no significant differences in the self and proxy reports of men's overall employment, as we saw in Table 2, there are variations in the types of activities identified. Compared to what their wives report, men are more likely to classify themselves as self-employed and contributing workers but less likely to classify themselves as wage workers. The differences in reporting are most pronounced in the case of wage work, particularly in casual employment. While only 27 per cent of men self-report as wage workers, their wives classify 37 per cent of them as such. Men are five percentage points more likely to categorize themselves as their own account workers (agriculture) and seven percentage points more likely to identify as contributing workers compared to their wives' reports.

It is notable that the differences in classification between self and proxy reports predominantly arise in the agricultural sector. With the exception of casual non-agricultural work for men, all other significant disparities in self-proxy reports are related to agricultural activities. In summary, the analysis reveals substantial differences in the classification of employment activities between self and proxy reports, affirming Prediction 2. These findings highlight the differing perceptions and categorizations of work within households.

Table 3: Differences in self and proxy reports of employment activity distribution

	Women			Men		
	Self	Proxy	Difference	Self	Proxy	Difference
Self-employed	*15.9*	*25.8*	*-9.9****	*48.7*	*46.2*	*2.5*
Own account worker agriculture	10.7	18.4	-7.7***	31.9	27.1	4.8**
Own account worker non-agriculture	4.5	5.7	-1.2	10.7	10.6	0.1
Employer agriculture	0.7	1.2	-0.5	4.4	6.7	-2.3**
Employer non-agriculture	0.00	0.5	-0.5	1.7	1.8	-0.1
Contributing work (CW)	*58.8*	*54.1*	*4.7**	*23.1*	*16.2*	*6.9****
CW agriculture	56.4	51.5	4.9*	22.5	15.1	7.4***
CW non-agriculture	2.4	2.6	-0.2	0.6	1.1	-0.5
Wage work	*24.6*	*17.7*	*6.3****	*27.3*	*37.2*	*-9.9****
Salaried	4.7	3.8	0.9	8.7	11.6	-2.9**
Casual agriculture	15.6	10.1	5.5***	7.2	10.2	-3.0**
Casual non-agriculture	4.3	3.8	0.5	11.4	15.4	-4.0***
N	717	651		872	889	

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively. Own account workers are defined as self-employed individuals who run their own enterprises or farm without any hired help. Employers are defined as self-employed workers who have hired help for their enterprise or farm. The sample is restricted to those who report or are reported as in the workforce. Salaried included paid interns.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

We further investigate the nature of the differences in the classification of activities. Table 4 compares the self-reported status (rows) against the proxy-reported status (column) for women and men in separate panels. The first row shows the proxy classification of women who report themselves to be self-employed. The diagonal elements of each panel represent the degree of agreement between the self and proxy reports. For example, 31 per cent of women who report themselves as self-employed are also classified as self-employed by their husbands, whereas 35 per cent of women who report themselves as self-employed are misclassified as contributing workers.

Overall, there are large differences in how women and men are misclassified by proxies compared to self reports. The disagreements in classification reflect differences in perceptions and differences in un-

derstanding the various categories, social norms, and information asymmetry. The degree of agreement on activity type is highest for women who classify themselves as out of the labour force (65 per cent) and least for those who classify themselves as unemployed (16 per cent). About one in five women who classify themselves as doing any employment activity are likely to be classified as not working by their husbands. Self-employment and contributing work are the two activities most likely to be mixed up for women. Thirty-five per cent of women who report themselves as self-employed are reported as contributing workers by their husbands, and 19 per cent of women who report as contributing workers are reported as self-employed by their husbands. Interestingly, wage work, which one might assume to have more clarity in terms of definition and visibility, shows substantive disagreements. Less than half of husbands agree with their wives on them being wage workers. About half of women reporting as unemployed are reported as out of the labour force by their husbands. About 18 per cent of women who report themselves as out of the labour force are viewed as contributing workers by their husbands.

Even for men for whom employment activities tend to be major and more visible, the disagreements between self and proxy reporting on activity type are substantial. Sixteen per cent of men who report themselves as self-employed are reported as contributing workers and 41 per cent of male contributing workers are reported as self-employed by their wives, reflecting the confusion in the interpretation of these two categories. More than half of men who report as unemployed or out of the labour force are reported as working in an employment activity by their wives. This might be due to social desirability bias by women who do not want to report their husbands' lack of economic activity or men hiding from their wives that they are unemployed or out of the labour force. Agreements are highest for wage work (67 per cent) and self-employment (55 per cent).

Table 4: Self and proxy activity-wise match

Self-reported	Proxy-reported				
	Self-employed	Contributing worker	Wage work	Unemployed	Out of labour force
Women					
Self-employed	31.0	35.4	6.2	1.8	25.7
Contributing worker	18.5	51.2	2.4	5.1	22.8
Wage work	17.1	14.1	47.1	3.5	18.2
Unemployed	10.1	20.3	4.4	15.9	49.3
Out of labour force	5.3	17.6	4.1	8.2	64.8
Men					
Self-employed	54.9	15.7	13.5	1.7	14.3
Contributing worker	40.8	16.9	23.9	1.9	16.4
Wage work	10.8	7.8	67.2	3.0	11.2
Unemployed	22.6	12.9	19.4	19.4	25.8
Out of labour force	26.9	8.7	26.5	3.5	34.4

Note: the table reports the mismatch in the activity distribution reported by self and proxy. The rows are the distribution reported by self reports, and the columns are the corresponding reports by proxies. Each row sums to 100.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

6.3 Regression results

Regression results corroborate the descriptive analyses that proxy significantly differs from self-reporting on women's labour market outcomes, but there are no statistically significant differences in self-proxy reporting about men's labour market outcomes. Table 5 presents the results of the estimation of equa-

tions 1 and 2 for workforce participation rate. The proxy (husband's) report of women's workforce participation is five percentage points lower than that reported by women themselves. This result holds after we add individual controls, household controls, and enumerator fixed effects and are robust to the inclusion of individual fixed effects. Proxies (wives) report two percentage points higher workforce participation for men compared to their own reporting, but this difference is not statistically significant across any of the models.

Proxies also under-report women's labour force participation but not men's labour force participation. No statistically significant difference exists between the unemployment rate reported by self and proxy respondents (Table B3). Reinforcing the descriptive analysis, the weekly hours of work (unconditional) are under-reported for women by proxies, but this divergence between self and proxy does not carry over to the conditional weekly hours of work.

Table 5: Differences in self-proxy reporting for workforce participation

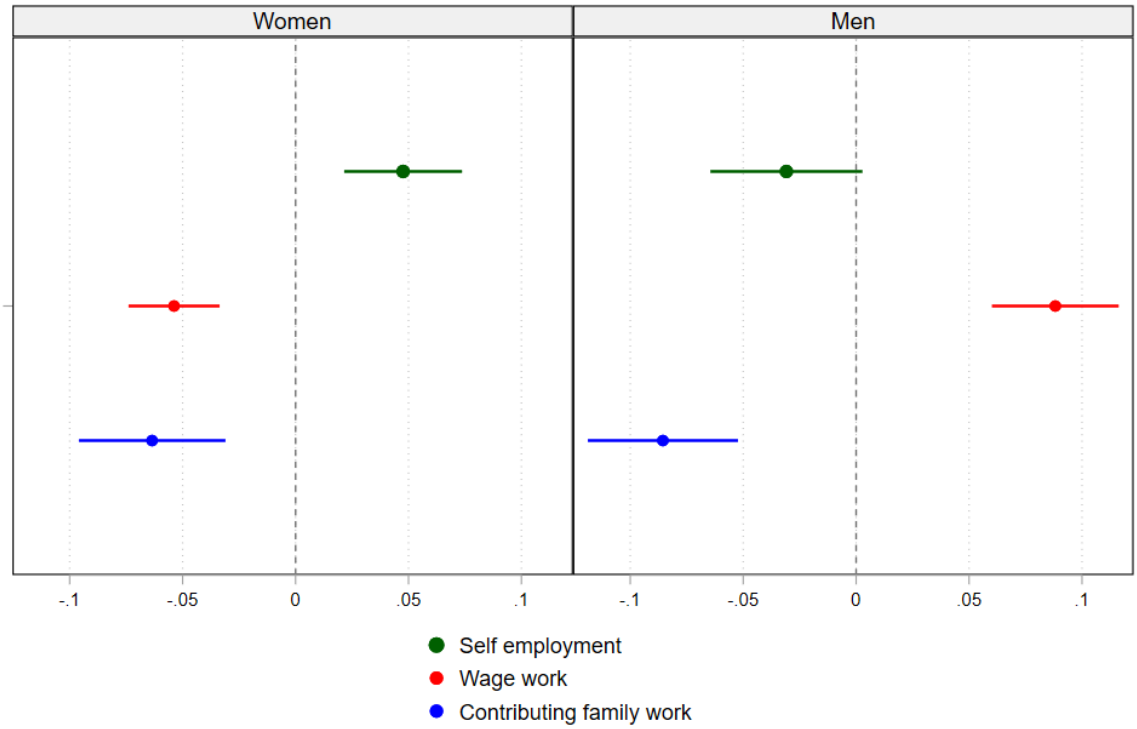
	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
Proxy	-0.05***	-0.05***	-0.05***	0.02	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Individual controls	No	Yes	No	No	Yes	No
Household controls	No	Yes	No	No	Yes	No
Enumerator fixed effects	No	Yes	Yes	No	Yes	Yes
Individual fixed effects	No	No	Yes	No	No	Yes
N	2,268	2,268	2,268	2,268	2,268	2,268

Note: dependent variable is 1 if reports/reported as working and 0 otherwise. Independent variable, proxy, is 1 if proxy-reported and 0 if self-reported. Individual and household controls include respondent and proxy education, age and age squared, respondent's major activity status in the year, household social group, landowning status, household size, share of dependents, and age and education difference between respondent and proxy. The reported number of observations (N) belong to a pooled sample where the individual appears twice: with self-reported employment status and then with proxy-reported employment status. Hence, the number of observations is double the number of individuals. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively. Robust standard errors are in parenthesis.
Source: authors' calculations based on data from the Indian Working Survey (IWS).

Further, we estimate a fixed effects model for each employment activity, controlling for all individual-specific attributes, and, as before, introduce an independent variable that captures whether a reported status is self- or proxy-reported (Figure 1).[17] The coefficient estimate gives the extent of difference in proxy reporting compared to self-reported status. Men report a higher proportion of women in self-employment (by five percentage points) and report lower participation in casual wage and contributing family work by a similar extent. Placed in the context of the overall workforce participation model, this reiterates the findings from Table 3 that, for women, lower reporting of workforce participation is combined with misattribution of employment activities.

[17] The coefficient estimates in the form of a table are presented in Table B4.

Figure 1: Estimates for differences in self and proxy reporting by employment activity



Note: the coefficients correspond to the estimates for the proxy variable from equation 2, estimated for each employment activity. The dependent variable is 1 if reports/reported as employed in that activity and 0 otherwise. The independent variable (proxy) is 1 if reported by proxy and 0 if self-reported. Individual fixed effects and enumerator fixed effects are included as controls. Standard errors are robust.

Source: authors' illustration based on data from the Indian Working Survey (IWS).

While men's overall employment estimates were not significantly different between self and proxy reports, within each activity type there is some mismatch. Wives report lower participation of their husbands in self-employment and contributing family work and higher participation in wage employment compared to husbands' self-reporting.

6.4 Correlates of divergence between self and proxy reports

We now examine the correlates of divergence between the self and proxy reports for overall and each employment activity (Table 6). In the reporting of overall employment for women (column 1), variables that proxy for asymmetric measurement and information error are significant correlates of under-reporting.

Asymmetric information error could explain some of the divergences in reporting if less marginal/intermittent, and more observable work is less likely to be under-reported. Our findings lend themselves to this interpretation—if the woman is primarily employed over the year, and specifically as a wage worker, then it significantly reduces the likelihood of her employment being not reported by her spouse. Also, when spouses are employed in the same activity, it is negatively associated with under-reporting. Presumably, the common activity facilitates greater information sharing between spouses. On the flip side, the educational difference between spouses significantly increases the likelihood of under-reporting. A similar relationship was observed by Kapur et al. (2021) in explaining the self-proxy difference in select cities in North India.

Asymmetric measurement errors also explain under-reporting to a certain extent. Women whose mothers-in-law were reported as employed (by their husbands) were less likely to have their own employment under-reported. All other individual-specific attributes including education and age have no significant association with the likelihood of under-reporting. Interestingly, the spouse's attributes have some association with under-reporting. Husbands with higher levels of education are less likely to under-report their wives' employment.

For self-employment, neither asymmetric information error nor asymmetric measurement error seemed to explain reporting differences. However, self-employment is more likely to be over-reported than under-reported, so under-reporting of self-employment only accounts for a small share of the sample. For contributing work, asymmetric measurement error explains some of the under-reporting. Specifically, if the husband reported that their mothers were in employment, they were less likely to under-report their wife's employment. Similar to overall employment, widening educational differences between the spousal pair increased the probability of under-reporting.

For wage work, unlike the other employment types, the woman's predominant activity for the majority of the year mattered. If the woman reported herself as principally employed in self-employment or wage work for the year, they were less likely to be under-reported. This is potentially a result of two processes at work—reduced asymmetric information error as the woman's primary activity during the year is a visible economic activity. Since wage work is more socially acceptable, presumably the husbands did not shy away from recognizing their wives' work. Interestingly, other indicators that capture the role of norms did not come into play. Husbands' reporting of their mother's employment or the time spent in household domestic chores did not have any significant impact on under-reporting of wage work.

Besides the woman's major activity status of the year, her other attributes including her age and educational attainment did not influence the likelihood of her work being under-reported, both overall as well as across different kinds of employment. The under-reporting was also unaffected by the hours of work that women spent in that activity.

We estimate a similar regression to understand correlates of over-reporting (Table 7). Overall, over-reporting increases if the woman is predominantly employed as a contributing family worker or wage worker for the majority of the year. If the spouses are in the same activity, it reduces differences in reporting. For self-employment, the major sources of over-reporting emerge from women who are predominantly in contributing family work being over-reported as self-employed. This points towards the misattribution that we saw earlier (Table 4). Therefore, women who were in wage work or contributing family work for the majority of the year were being reported as self-employed by their husbands. Similarly, the over-reporting of contributing work is largely for those women who are primarily in self-employment or unpaid family work, again indicating the misattribution of work. For those women who were primarily engaged as wage workers for the majority of the year, there was a higher chance of their husbands over-reporting them as being in wage work in that particular week.

We undertook a similar analysis of the correlates of under-reporting for men's employment (Appendix Table B5). For men's employment (overall and across employment types), their predominant activity during the year was the only significant correlate of under-reporting. If men were in self-employment or family work for the majority of the year, they were less likely to be under-reported. Similarly, a higher number of hours in employment in that week reduced the probability of under-reporting, a factor that had no significant influence on the under-reporting of women's employment. Not surprisingly, the proxy, i.e. the wife's attributes or covariates of asymmetric measurement, had no bearing on the under-reporting of men's employment. We find similar results in the case of over-reporting men's work—the major activity status is the main correlate of likelihood of over-reporting across employment types (see Table B6 in the Appendix).

Table 6: Correlates of under-reporting, women

	(1) Overall	(2) Self-employment	(3) Contributing worker	(4) Wage
Wife's attributes				
Age	-0.01	0.09	-0.03	-0.04
	(0.02)	(0.07)	(0.02)	(0.07)
	(0.00)	(0.00)	(0.00)	(0.00)
Education (base: illiterate)				
Primary/middle	0.03	-0.13	-0.12	-0.00
	(0.62)	(-0.53)	(1.73)	(-0.04)
Secondary+	0.05	0.16	0.15	-0.06
	(0.72)	(0.65)	(1.45)	(-0.26)
Husband's attributes				
Age	-0.01	-0.05	0.02**	0.02
	(0.01)	(0.03)	(0.01)	(0.02)
Education (base: illiterate)				
Primary/middle	-0.16***	0.13	-0.15*	0.02
	(0.05)	(0.23)	(0.08)	(0.13)
Secondary+	-0.23***	0.05	-0.21**	-0.00
	(0.06)	(0.25)	(0.10)	(0.18)
Asymmetric information covariates				
Woman's major activity (base: out of workforce)				
Self-employed	-0.11	-0.19	0.06	-0.59*
	(0.07)	(0.27)	(0.10)	(0.31)
Contributing worker	-0.06	-0.41	0.08	-0.34
	(0.06)	(0.37)	(0.08)	(0.24)
Wage	-0.16**	0.03	0.10	-0.45***
	(0.06)	(0.34)	(0.09)	(0.17)
Spouses in same activity	-0.12***	-0.03	-0.18***	-0.22
	(0.04)	(0.15)	(0.06)	(0.15)
Total weekly hours worked	-0.00	0.01*	-0.00	-0.00
	(0.00)	(0.01)	(0.00)	(0.00)
Age difference	0.00	0.02	-0.03*	-0.03
	(0.01)	(0.06)	(0.01)	(0.03)
Educational difference	0.02***	-0.02	0.02***	0.04**
	(0.01)	(0.03)	(0.01)	(0.02)
Asymmetric measurement covariates				
Difference time on domestic work (wife - husband)	0.00	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Husband's mother employed	-0.11**	0.21	-0.17***	-0.10
	(0.04)	(0.21)	(0.06)	(0.14)
Household attributes				
Asset tercile (base: poorest)				
Middle	-0.06	0.03	-0.11	0.01
	(0.05)	(0.29)	(0.07)	(0.13)
Richest	-0.02	0.30	-0.08	0.09
	(0.05)	(0.27)	(0.08)	(0.17)
Social group (base: general/OBC)				
SC/ST	-0.00	0.21	-0.15**	0.23
	(0.05)	(0.25)	(0.07)	(0.14)
Observations	716	143	487	185

Note: this sample is conditioned on women who report as being in that employment. The dependent variable is 1 if the husband disagrees and reports her as not employed and 0 if he agrees that she is employed. Other controls include age squared, number of adult females and dependents (children younger than 6 years and adults older than 65 years), enumerator, PSU, and state fixed effects. Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

Table 7: Correlates of over-reporting, women

	Overall	Self-employment	Contributing worker	Wage
Wife's attributes				
Age	-0.02	0.01	-0.03*	0.00
	(0.02)	(0.01)	(0.02)	(0.01)
Education (base: illiterate)				
Primary/middle	0.08	-0.02	-0.01	0.02
	(0.07)	(0.03)	(0.05)	(0.02)
Secondary+	-0.01	-0.05	-0.00	0.06**
	(0.09)	(0.04)	(0.06)	(0.03)
Husband's attributes				
Age	0.02	0.00	0.03**	0.01
	(0.01)	(0.01)	(0.01)	(0.00)
Education (base: illiterate)				
Primary/middle	0.11	0.04	0.07	0.04*
	(0.07)	(0.03)	(0.05)	(0.02)
Secondary+	-0.01	0.04	0.00	-0.01
	(0.08)	(0.04)	(0.05)	(0.02)
Asymmetric information covariates				
Woman's major activity (base: out of workforce)				
Self-employed	0.08	0.26***	0.18**	0.03
	(0.20)	(0.08)	(0.07)	(0.02)
Contributing worker	0.23**	0.13***	0.18**	-0.01
	(0.11)	(0.03)	(0.08)	(0.02)
Wage	0.20**	0.10***	0.04	0.17***
	(0.08)	(0.03)	(0.05)	(0.04)
Spouses in same activity	-0.14**	-0.02	-0.07*	0.01
	(0.06)	(0.02)	(0.04)	(0.02)
Age difference	-0.01	-0.01	-0.03**	-0.00
	(0.02)	(0.01)	(0.02)	(0.01)
Educational difference	0.00	0.00	-0.00	0.00
	(0.01)	(0.00)	(0.01)	(0.00)
Asymmetric measurement covariates				
Difference in time spent on domestic work (wife - husband)	0.00	0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Husband's mother employed	0.08	0.05**	0.07	0.02
	(0.07)	(0.02)	(0.05)	(0.02)
Household attributes				
Asset tercile (base: poorest)				
Middle	-0.04	0.02	-0.01	0.00
	(0.08)	(0.03)	(0.04)	(0.02)
Richest	-0.06	0.03	-0.06	-0.02
	(0.09)	(0.03)	(0.05)	(0.02)
Social group (base: general/OBC)				
SC/ST	-0.05	-0.01	-0.08*	-0.01
	(0.07)	(0.03)	(0.04)	(0.02)
Observations	372	855	552	806

Note: this sample is conditioned on women who report as not being in that employment. Dependent variable is 1 if the husband disagrees and reports her as employed and 0 if he agrees that she is not employed. Other controls include age squared, number of adult females and dependents (children younger than 6 years and adults older than 65 years), enumerator, PSU, and state fixed effects. Robust standard errors are in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

7 Framing experiment results

In this section, we present the results of the framing experiment conducted to investigate the impact of employment questions on reporting. First, we discuss the characteristics of the samples across treatment arms. Next, using descriptive and regressions analyses, we compare the employment outcomes from the three arms of the experiment.

Table 8: Sample characteristics by experimental arm

	Single weekly (1)	Detailed weekly (2)	Single daily (3)	Difference (1–2) (4)	Difference (1–3) (5)
Women (%)	55	57	62	-2	5*
Average age (in years)					
Men	41	40	40	1	1
Women	41	39	41	2	0
Men's education					
Illiterate	42	37	42	5	0
Primary/middle	22	25	20	-3	2
Secondary and above	36	38	38	-2	-2
Women's education					
Illiterate	44	50	49	-6	-5
Primary/middle	29	26	20	3	9
Secondary and above	27	24	31	3	-4
Social group (%)					
Scheduled Caste/Tribe	37	42	46	-5	-9
Other Backward Caste	54	51	48	3	6
General	8	8	6	0	2
Men's yearly activity status (%)					
Self-employed	42	44	44	-2	-2
Contributing worker	3	2	3	1	0
Wage work	37	40	41	-3	-4
Out of workforce	18	14	12	4	6
Women's yearly activity status (%)					
Self-employed	7	9	8	-2	-1
Contributing worker	19	15	12	4	7**
Wage work	27	34	38	-7	-10**
Out of workforce	46	42	43	4	3
N	327	2,415	300		

Note: column 4 refers to the difference between sample characteristics for the single weekly and detailed weekly. Column 5 refers to the difference between sample characteristics for single weekly and single daily modules. The significance stars are from a t-test of these differences. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

Most sample characteristics are not statistically different between the single weekly and the other two arms of the experiment (detailed weekly and single daily) (Table 8). Only the yearly activity status of women varies significantly across the experimental arms. To account for these differences, we control for yearly activity status in the regression analysis.

7.1 Employment outcomes

Table 9 presents the reported employment outcomes from each of the three arms of the experiment separately, for women and men. In the single weekly arm, an individual is considered part of the workforce if they respond in the affirmative to the single employment question. In the detailed weekly, if an individual responds in the affirmative to any of the multiple questions on various employment activities, then they are considered part of the workforce. In the single daily arm, if an individual reports being employed in any of the days of the last week for at least an hour, they are included as part of the workforce.

Table 9: Employment estimates by experimental arm

	Single weekly (1)	Detailed weekly (2)	Single Daily (3)	Difference (1–2) (4)	Difference (1–3) (5)
Women					
Labour force participation rate	48.3	63.2	57.3	-15***	-9.0
Workforce participation rate	48.3	58.2	55.7	-9.9***	-7.4
Unemployment rate	1.15	7.9	5.21	-5.0***	0.0
Avg daily hours of work (unconditional)	4.8	3.4	3.3	1.4	-1.1
Avg daily hours of work (conditional)	9.9	5.9	5.9	4.0***	0.0
Men					
Labour force participation rate	78.2	73.8	83.5	4.3	-5.2
Workforce participation rate	78.2	71.8	82.6	6.4*	-4.4
Unemployment rate	0.0	2.7	4.7	-2.0***	0.0
Avg daily hours of work (unconditional)	8.4	5.0	5.8	3.4***	2.1***
Avg daily hours of work (conditional)	10.8	7.0	7.2	3.8***	0.1
N	327	2,415	300		

Note: daily hours of work (unconditional) correspond to average daily hours worked, averaged across all responses, irrespective of reported employment status (if not working, then they are assumed to have zero hours). Daily hours of work (conditional) corresponds to average daily hours worked conditional on reporting as being employed. Column 4 refers to the difference between sample characteristics for the single weekly and detailed weekly. Column 5 refers to the difference between sample characteristics for single weekly and single daily modules. The significance stars are from a t-test of these differences. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

Asking multiple questions about employment activities increases the reported labour and workforce participation rate of women significantly. When responding to multiple questions on weekly employment activities, women's LFPR is 63 per cent, while this is only 48 per cent when a single weekly question is asked. For men, asking multiple questions leads to a decline in the workforce participation rate from 78 per cent to 74 per cent, but this is not statistically significant. The average hours of work are higher when a single weekly question is asked as opposed to when multiple questions are asked for both women and men.

A shorter reference period—daily vs weekly—increases the reported labour force and workforce participation rates for both women and men. These differences are not significant, partly due to the small sample size of these experimental arms. Women's labour force participation increases by nine percentage points and men's increases by five percentage points when asked one question about each of the previous seven days compared to one question about the previous week.

As Table 8 shows, there is a difference in the size of the samples across the experimental arms and some differences in characteristics of the samples. Given this, we first match the sample size between the detailed weekly (largest experimental arm) and the short daily and weekly arms of the experiment. We randomly draw a subset of individuals from the detailed weekly arm equivalent in size to the experiment arms. This is pooled with the experiment data. We run a simple linear probability model with an employment estimate as the dependent variable, and as controls we introduce binary variables to indicate the source of the estimate (single weekly, single daily, detailed weekly). We estimate bootstrapped coefficients by drawing multiple sub-samples from the detailed weekly module and estimating the linear probability model with bootstrapped coefficients. The final coefficient reported is the average of the bootstrapped coefficients. We also do a similar linear probability model with controls to account for the difference in the sample composition.

Table 10 provides the estimates of the impact on reported workforce participation on ways in which the question is asked. Without controls, we find that the women's employment estimate increases significantly when we move from single weekly to detailed weekly, while for men there is no significant change. Bootstrapped estimates indicate that detailed weekly as well as single daily estimates are significantly higher than single weekly estimates. Women's workforce participation rates are between 7 and 10 percentage points higher in detailed weekly than single weekly, and similarly, single daily estimates are five to seven percentage points higher than single weekly estimates. In the case of men, there is a decrease in men's workforce participation rates when men are asked detailed weekly questions or single daily questions compared to when they are asked single weekly questions. But these differences are not significant. We also estimate the impact on other labour market outcomes—reported labour force participation rate and unemployment rate (Table B7). Reported labour force participation and unemployment rates for both women and men are significantly higher in both detailed weekly and single daily modules compared to a single weekly module, except for labour force participation in detailed weekly for men.

Table 10: Employment estimates for activities by experimental arm

	(1)	(2)	(3)	(4)
Women				
Labour module (base: single weekly)				
Detailed weekly	0.10***	0.07	0.09**	0.07***
	(0.04)	(0.05)	(0.00)	(0.00)
Single daily	0.07	0.07	0.07**	0.05***
	(0.05)	(0.06)	(0.00)	(0.00)
N	1,739	1,190	544	312
Men				
Labour module (base: single weekly)				
Detailed weekly	-0.06*	-0.06	-0.06	-0.06
	(0.04)	(0.04)	(0.00)	(0.00)
Single daily	0.04	0.03	0.04	0.03
	(0.05)	(0.06)	(0.00)	(0.00)
N	1,302	884	383	253
Individual controls	No	Yes	No	Yes
Bootstrap standard errors	No	No	Yes	Yes

Note: columns (1)–(4) show regression results for workforce participation on questionnaire source. Dependent variable is 1 if individual is in the workforce and 0 otherwise. Each estimate represents the coefficient on the categorical variable indicating the source of the employment estimate. Controls include individual's age, education, activity status for the majority of the year, social group, and household assets. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

7.2 Activity reporting

Next, we compare the distribution of activity type reported in the three experimental arms (Table 11). We find that women are less likely to be identified by themselves as self-employed or contributing family workers and more likely to be identified as out of the workforce. Calling out activities rather than having a 'keyword' question has this impact. But given the small sample size, we do not find these results to be significant. Changing the recall period and asking about each day of the week separately as opposed to one question leads to an increase in women being reported as wage workers and less likely to be reported as out of the workforce.

Table 11: Distribution of activities by different labour modules

	Single weekly (1)	Detailed weekly (2)	Single daily (3)	Difference (1-2)	Difference (1-3)
Women					
Self-employed	8.9	11.5	6.5	-2.6	2.4
Contributing worker	20.4	24.8	18.4	-4.4	2
Wage worker	22.1	21.9	38.4	0.2	-16.3***
Out of workforce	48.5	41.8	36.8	6.7	11.7**
N	167	1,033	185		
Men					
Self-employed	42.4	34.0	38.3	8.4*	4.1
Contributing worker	7.6	20.7	4.4	-13.1***	3.2
Wage worker	36.4	17.1	46.1	19.3***	-9.7
Out of workforce	13.6	28.2	11.3	-14.5***	2.3
N	132	1,369	115		

Note: columns 4 and 5 denote two-sided t-tests for differences between single weekly vs detailed weekly and single weekly vs single daily, respectively. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

8 Conclusion

Measures of work and employment play a crucial role in assessing an economy and informing policy-making. Yet, employment statistics, especially for women, are often contentious both in their conceptualization and operationalization. In contexts characterized by highly informal, marginal work as well as pervasive norms around who works and what they do, measurement and reporting challenges are exacerbated.

Our research shows that women's employment estimates are subject to several types of errors. Who is asked the survey questions has a significant impact on the reported level of women's labour force participation rate. Labour surveys typically approach the household head to collect information on employment and other demographic characteristics of all members of the household. We demonstrate there is significant under-reporting when men report about women's work. For men, there is no such difference between men's self-reported employment estimates and the reports of their work by their spouses. We find that the under-reporting of women's work is a result of biases regarding women's expected status as homemaker or economically active and information asymmetry between spouses.

Alongside systematic under-reporting of women's work, we also find a misattribution by the proxy in the kinds of work that women and men do. This misattribution is especially seen in the case of contributing family work and self-employment in agriculture. The lack of a clear definitional boundary between these two kinds of employment leaves it open to ambiguity in their interpretation.

The framing and recall period also have a significant impact on reported levels of labour force participation. A single question about women's employment is likely to miss many economically active women. Rather, calling out each kind of employment activity leads to a significant increase in reported esti-

mates of women's employment. Further, separate questions about each day of the week leads to higher reporting of women's work compared to asking a single question for the entire week.

National statistical agencies need to be mindful of who and how they ask labour force questions due to the implications on employment estimates. Asking multiple people in the household about their own labour market status when feasible is one option to be considered. Other simple tweaks in the survey instrument can get at better employment estimates. In the Indian context, national statistical agencies should change its practice of asking a single question about employment to multiple questions that call out different activities to better capture women's work. This change is relatively easy, cheap, and effective. It will also help align national surveys with ILO's recommended method of capturing labour market outcomes.

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Appendix

A Measurement error

We present a mathematical model and provide a hypothesis to test the different sources of measurement error. We build on the model by Ambler et al. (2021) that was used to explain self-proxy reporting differences in reporting on asset ownership and decision making.

A1 Random measurement error

The proportion of households in the sample where the wife is employed is denoted by A, and the proportion of households in which the wife is not employed is denoted as (1-A). This is the 'true' state, and final reporting (by the husband or wife) may deviate from this. For simplicity of exposition, we present a testable hypothesis only about the wife's responses. Similar hypotheses also apply to responses about the husband's employment status. In the case of random measurement error, as in Ambler et al. (2021), we assume that the probability of an error in reporting, denoted by p, is the same between the husband (H) and wife (W) and equally likely irrespective of whether the wife is in the labour force or not. Similarly, the probability of being correct is $1-p$.

The wife's labour market status is Y when she participates in the labour market and N when she does not. The disagreement situations arise when the wife says that she is employed and the husband says she is not, and vice versa. The probabilities of each type of disagreement can be written as:

$$Pr(W:Y,H:N) = A(1-p)p + (1-A)p(1-p) = (1-p)p$$
$$Pr(W:N,H:Y) = Ap(1-p) + (1-A)(1-p)p = (1-p)p$$

We find that the probability of both types of disagreements are equal and only depend on the common probability of error and not on any other factor.

A2 Asymmmetric measurement error

Asymmetric measurement error arises due to differences in perceptions or understanding of concepts. In asymmetric measurement error, the probability of measurement error varies across spouses, and errors are made with probability s by wives and probability r by husbands. The errors are equally likely in both scenarios, whether the wife is working or not. We write the probability of each type of disagreement as follows:

$$Pr(W:Y,H:N) = A(1-s)r + (1-A)s(1-r) = A(r-s) + s(1-r)$$
$$Pr(W:N,H:Y) = As(1-r) + (1-A)(1-s)r = A(s-r) + r(1-s)$$

The probabilities of the two types of disagreements are not equal. Now we consider the probability of overall disagreement on women's labour force participation:

$$Pr((W:Y,H:N) \cup (W:N,H:Y)) = s + r - 2rs$$

The overall disagreement is dependent only on the probabilities of error by the wife and the husband (s and r), so we should find that activity definitions in which the husband and wife are likely to disagree should have higher errors, e.g., contributing worker or among spouses who have larger differences in gender norms.

A3 Asymmetric information error

Asymmetric information error arises due to differences in information (either due to active hiding or unintentionally) between men and women about each other's activities. To model this, following Ambler et al. (2021), we introduce a new state to take into account asymmetric information. In the state where the wife works (Y), the activity is unobserved with probability B. Since some work activities are less likely to be observed than others, B will vary across work activities.

We now have three states of the world: first where the wife works (A), but the activity is unobserved (B households); second where the wife works (A), but the activity is observed (1-B households); and third where the wife does not work (1-A households). The joint probability of measurement error due to asymmetric information is:

$$Pr((W:Y,H:N)\cup(W:N,H:Y)) = AB(2r-1)(2s-1)-2rs+r+s$$

Both A and B vary by activity type and the couple's characteristics.

B Appendix tables

Table B1: Detailed weekly module: blocks and questions

Detailed weekly (main survey questions)	
Core block	
Employment category	Employment questions
Self-employment	Last week, did you do any kind of business, farming, or other self-employed activity to generate income, even if only for one hour?
Unpaid family helper	Last week, did you assist without pay in a business/farm/livestock of a household or family member, even if only for one hour?
Wage work (casual/salaried)	Last week, did you work for a wage, salary, commission, or any payment in kind, including doing paid domestic work, even if only for one hour?
Apprentice/intern	Last week, did you work for pay as an apprentice, intern, or trainee, even if only for one hour?
Small-scale production	Last week, did you engage in small-scale production of goods or services at home that were exchanged for cash or in kind, even if only for one hour?
Unpaid volunteer	Last week, did you work as an unpaid volunteer or do any kind of unpaid social work, even if only for one hour?
Recovery block	
Overall recovery	Did you miss reporting any work activities that led to you earning an income or help household members with an activity that generated an income, even if only for one hour?
Short absence block	
Duration of absence	Even though you did not work last week, when do you expect to go back to work?
Type of work on return	If you do work in general for wages/profit, what do you normally do?
Underemployment block	
Desire for more work	Would you have wanted to do more work for pay or profit in the last week?
Hours underemployed	Did you have the time to do more work in the last week for pay or profit (in addition to the work you were already doing)? How many hours in the week would you have had time to do more work?
Unemployment block	
Search for jobs	Last week, did you look for work either through employment exchanges, intermediaries, friends, or relatives or apply for work with prospective employers?
Willingness to work	Last week, although you did not look for work, were you willing to work if work was available?
For self-consumption block	
Goods produced	Last week, did you engage in any production of goods for your own/household consumption, even if for only an hour?

Source: authors' compilation based on data from the Indian Working Survey (IWS).

Table B2: Sample characteristics for spousal and non-spousal pairs (18 years and older)

Characteristics	Male		Difference	Female		Difference
	Spousal pair	Non-spousal pair		Spousal pair	Non-spousal pair	
Age	42.33	32.56	-9.77***	36.77	39.8	3.02***
Education status						
Below secondary	0.67	0.44	-0.23***	0.78	0.76	-0.03
	0.01	0.02	0.02	0.01	0.01	0.02
Above secondary	0.33	0.56	0.23***	0.22	0.24	0.03
	0.01	0.02	0.02	0.01	0.01	0.02
Religion						
Hindu	0.95	0.93	-0.02	0.97	0.96	-0.01
	0.01	0.95	0.01	0	0.01	0.01
Non-Hindu	0.05	0.07	0.02	0.03	0.04	0.01
	0.01	0.01	0.01	0	0.01	0.01
Social group						
SC	0.24	0.24	0	0.25	0.26	0.01
	0.01	0.01	0.02	0.01	0.01	0.02
ST	0.13	0.12	-0.01	0.14	0.12	-0.02
	0.01	0.01	0.01	0.01	0.01	0.01
OBC	0.49	0.47	-0.01	0.49	0.48	-0.01
	0.01	0.02	0.02	0.01	0.02	0.02

Source: authors' calculations based on data from the Indian Working Survey (IWS).

Table B3: Estimation of difference between self and proxy reports for other labour market outcomes by gender

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
Labour force participation	-0.06***	-0.06***	-0.06***	0.02	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Unemployment rate	0.00	0.00	0.01	-0.00	-0.00	0.00
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Weekly hours of work (unconditional)	-2.36***	-2.36***	-2.36***	0.05	0.01	0.05
	(0.85)	(0.77)	(0.66)	(1.10)	(1.02)	(0.92)
Weekly hours of work (conditional)	-1.16	-0.77	-1.03	-0.70	-0.74	-1.26
	(1.07)	(1.03)	(1.00)	(1.05)	(1.05)	(0.98)
Individual controls	No	Yes	No	No	Yes	No
Household controls	No	Yes	No	No	Yes	No
Individual fixed effects	No	No	Yes	No	No	Yes
N	2,268	2,268	2,268	2,268	2,268	2,268

Note: dependent variable is 1 if reports/reported as working and 0 otherwise. Independent variable proxy takes a value of 1 if employment is reported by proxy and 0 if self-reported. Controls include respondent and proxy education, age and age squared, respondent's major activity status in the year, household social group, land-owning status, household size, share of dependents, age and education difference between respondent and proxy, and enumerator fixed effects. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

Table B4: Estimates for differences in self and proxy reporting by employment activity

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
Self-employment	0.05***	0.05***	0.05***	-0.03	-0.03	-0.03*
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Wage	-0.05***	-0.05***	-0.05***	0.09***	0.09***	0.09***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
Unpaid	-0.06***	-0.06***	-0.06***	-0.09***	-0.09***	-0.09***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Individual controls	No	Yes	No	No	Yes	No
Household controls	No	Yes	No	No	Yes	No
Enumerator fixed effects	No	Yes	Yes	No	Yes	Yes
Individual fixed effects	No	No	Yes	No	No	Yes
N	2,268	2,266	2,268	2,268	2,266	2,268

Note: dependent variable is 1 if reports/reported as working in that activity and 0 otherwise. Independent variable proxy is 1 if reported by proxy and 0 if self-reported. Individual and household controls include respondent and proxy education, age and age squared, respondent's major activity status in the year, household social group, land-owning status, household size, share of dependents, and age and education difference between respondent and proxy. The reported number of observations (N) belongs to a pooled sample where the individual appears twice: with their self-reported employment status and their proxy-reported employment status. Hence, the number of observations is double that of the number of individuals. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

Table B5: Correlates of under-reporting, men

	Overall	Self-employment	Contributing worker	Wage
Husband's attributes				
Age	-0.01	-0.01	-0.00	-0.11*
	(0.02)	(0.02)	(0.04)	(0.06)
Education (base: illiterate)				
Primary/middle	-0.04	-0.11	-0.27**	0.01
	(0.04)	(0.08)	(0.13)	(0.12)
Secondary+	-0.01	-0.07	-0.21	-0.01
	(0.05)	(0.10)	(0.19)	(0.15)
Wife's attributes				
Age	0.00	0.01	-0.00	0.04
	(0.01)	(0.01)	(0.03)	(0.04)
Education (base: illiterate)				
Primary/middle	-0.01	-0.07	0.06	-0.17
	(0.03)	(0.08)	(0.11)	(0.10)
Secondary+	-0.02	-0.01	0.02	-0.20
	(0.05)	(0.09)	(0.14)	(0.13)
Asymmetric information covariates				
Man's major activity (base: OOWF)				
SE	-0.18	-0.04	0.05	-0.42
	(0.12)	(0.20)	(0.24)	(0.48)
Unpaid	-0.25*	0.72***	-0.34	
	(0.14)	(0.27)	(0.36)	
Wage	-0.15	0.31	-0.03	-0.52
	(0.12)	(0.21)	(0.25)	(0.48)
Total weekly hours worked	-0.00	-0.01***	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Asymmetric measurement covariates				
Spousal difference in domestic work	-0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Age difference	0.00	0.02	-0.00	0.05
	(0.01)	(0.02)	(0.04)	(0.05)
Educational difference	-0.00	0.00	0.02	-0.00
	(0.01)	(0.01)	(0.02)	(0.01)
Household attributes				
Asset tercile (base: poorest)				
Middle	0.06*	0.11	-0.05	-0.00
	(0.04)	(0.08)	(0.13)	(0.10)
Richest	0.04	0.03	-0.15	0.15
	(0.04)	(0.08)	(0.15)	(0.17)
Social group (base: general/OBC)				
SC/ST	-0.00	-0.09	0.11	0.10
	(0.04)	(0.09)	(0.13)	(0.12)
Karnataka	0.14	0.99	1.43	0.52
	(0.45)	(0.78)	(0.99)	(0.46)
Observations	744	432	295	226

Note: robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
Source: authors' calculations based on data from the Indian Working Survey (IWS).

Table B6: Correlates of over-reporting, men

	Overall	Self-employment	Contributing worker	Wage
Husband's attributes				
Age	0.09	0.00	-0.01	0.02
	(0.05)	(0.03)	(0.01)	(0.01)
Education (base: illiterate)				
Primary/middle	-0.01	-0.05	0.04	0.05
	(0.15)	(0.06)	(0.04)	(0.05)
Secondary+	-0.02	-0.13**	0.06	0.02
	(0.13)	(0.07)	(0.05)	(0.05)
Wife's attributes				
Proxy age	-0.02	-0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.01)	(0.01)
Education (base: illiterate)				
Primary/middle	0.00	0.05	-0.04	-0.01
	(0.13)	(0.05)	(0.04)	(0.05)
Secondary+	-0.10	0.01	-0.10**	0.04
	(0.17)	(0.07)	(0.05)	(0.06)
Asymmetric information covariates				
Husband's major activity				
SE	0.23	0.39***	0.02	-0.09
	(0.17)	(0.08)	(0.06)	(0.05)
Unpaid	-0.98***	0.31**	-0.14	-0.11
	(0.28)	(0.15)	(0.19)	(0.14)
Wage	-0.02	-0.08	-0.03	0.21***
	(0.14)	(0.08)	(0.06)	(0.06)
Asymmetric measurement covariates				
Difference in time in domestic work (wife - husband)	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Age difference	-0.04	-0.00	-0.02	-0.01
	(0.03)	(0.02)	(0.01)	(0.01)
Educational difference	-0.00	0.01	-0.01	0.01
	(0.01)	(0.01)	(0.00)	(0.01)
	(0.07)	(0.02)	(0.02)	(0.02)
	(0.05)	(0.03)	(0.02)	(0.02)
Household attributes				
Asset tercile (base: poorest)				
Middle	0.00	0.06	-0.04	0.03
	(0.12)	(0.05)	(0.04)	(0.04)
Richest	0.02	0.04	0.08*	0.01
	(0.14)	(0.06)	(0.05)	(0.05)
Social group (base: general/OBC)				
SC/ST	-0.06	0.03	0.04	-0.05
	(0.16)	(0.06)	(0.04)	(0.05)
Karnataka	0.13	-0.45	-0.13	-0.13
	(0.77)	(0.50)	(0.39)	(0.33)
Observations	234	546	683	752

Note: robust standard errors in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
Source: authors' calculations based on data from the Indian Working Survey (IWS).

Table B7: Impact on employment estimates from different framing, by gender

	(1)	(2)	(3)	(4)
Labour force participation rates (LFPR)				
Women				
Labour module (base: single weekly)				
Detailed weekly	0.15***	0.14***	0.16***	0.15***
	(0.04)	(0.04)	(0.00)	(0.00)
Single daily	0.09*	0.09	0.10***	0.09***
	(0.05)	(0.06)	(0.00)	(0.00)
N	1,739	1,190	528	309
Men				
Labour module (base: single weekly)				
Detailed weekly	-0.04	-0.04	-0.05***	-0.08***
	(0.04)	(0.03)	(0.00)	(0.00)
Single daily	0.05	0.03	0.05***	0.03***
	(0.05)	(0.04)	(0.00)	(0.00)
N	1,302	884	399	261
Unemployment rate (UR)				
Women				
Labour module (base: single weekly)				
Detailed weekly	0.07***	0.06	0.12***	0.10***
	(0.01)	(0.03)	(0.00)	(0.00)
Single daily	0.04	0.03	0.04***	0.03***
	(0.02)	(0.04)	(0.00)	(0.00)
N	1,062	711	298	171
Men				
Labour module (base: single weekly)				
Detailed weekly	0.03*	0.02	0.02***	0.01***
	(0.01)	(0.01)	(0.00)	(0.00)
Single daily	0.05*	0.05*	0.05***	0.05***
	(0.02)	(0.03)	(0.00)	(0.00)
N	979	657	311	197
Individual controls	No	Yes	No	Yes
Bootstrap standard errors	No	No	Yes	Yes

Note: dependent variable is 1 if individual is in the workforce and 0 otherwise. Each estimate represents the coefficient on the categorical variable indicating the source of the employment estimate. Controls include individual's age, education, activity status for the majority of the year, social group, and household assets. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).

Table B8: Activity-wise employment estimates by framing of labour questions

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Self-employment								
Labour module (base: single weekly)								
Detailed weekly	0.02	0.04	-0.02***	-0.004***	-0.02	0.06	-0.07***	-0.02***
	0.04	0.05	0	0	0.05	0.05	0	0
Single daily	-0.06	-0.02	-0.06***	-0.03***	-0.01	0.08	-0.01***	0.05***
	0.05	0.05	0	0	0.07	0.06	0	0
N	984	647	290	159	944	637	313	209
Wage work								
Labour module (base: single weekly)								
Detailed weekly	-0.05	0.01	0.04***	-0.04***	-0.17***	-0.22***	-0.18***	-0.2***
	0.06	0.06	0	0	0.05	0.04	0	0
Single daily	0.13*	0.07	0.10***	0.02***	0.04	-0.04	0.05***	-0.003***
	0.07	0.07	0	0	0.07	0.06	0	0
N	990	652	521	299	957	645	406	275
Contributing family worker								
Labour module (base: single weekly)								
Detailed weekly	0.03	-0.03	0.06***	0.05***	0.20***	0.17***	0.30***	0.28***
	0.05	0.06	0	0	0.03	0.03	0	0
Single daily	-0.07	-0.02	-0.06***	0.01***	-0.03	-0.03	-0.03***	-0.02***
	0.07	0.07	0	0	0.04	0.04	0	0
N	984	647	290	159	944	637	313	209
Individual controls	No	Yes	No	Yes	No	Yes	No	Yes
Bootstrapped SE	No	No	Yes	Yes	No	No	Yes	Yes

Note: dependent variable takes the value 1 if the individual reports working in self-employment, wage, or CFW and 0 otherwise (conditional on being in the workforce). Controls include individual's age, education, activity status for the majority of the year, social group, and household assets. *, **, and *** indicate significance at the 10%, 5%, and 1% level of significance, respectively.

Source: authors' calculations based on data from the Indian Working Survey (IWS).