Does maternal migration affect spousal labour market decisions?

Evidence from Sri Lanka

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Abstract

This paper examines Sri Lankan men's labour market outcomes when their wives emigrate to work, leaving the husbands and their children at home in Sri Lanka—the effects of maternal migration on the husbands' labour market decisions. We used nationally representative cross-sectional data and historical migration rates at the community level as an instrument for maternal migration in two-stage least-squares estimations. We find that maternal migration reduces the husbands' labour supply. Husbands are more likely to exit the labour market and become unemployed; the employed are less likely to moonlight and have lower wages, and those that exit the labour market are more likely to become stay-at-home dads. Using a second instrument, an indicator of whether a community has foreign-employment agencies, we also confirmed our main results. Our findings indicate that policies that aim to promote female migration as an exogenous income source may fall short if they do not address the effects of the husbands' labour market decisions.

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1. Introduction

An increasing number of people emigrate and remit money back home; many of them are women, and mothers, from developing countries (Cortes, 2015; United Nations, 2013). In the last two decades, the flow of international migration has increased by more than 50 per cent and remittances by more than 100 per cent (Clemens & McKenzie, 2018; United Nations, 2013). In 2020, 281 million people (about 3 per cent of the world's population) were migrants: More than 40 per cent of these migrants are from developing countries, and 48 per cent of them are women (UNDESA, 2020). In 2018, developing countries received over US$ 500 billion in remittances, which are larger than foreign aid or foreign direct investment in some of these countries (World Bank, 2019).

Some migrants are "split migrants", i.e., migrants who emigrate without their family members' company (Antman, 2012). In Sri Lanka, the country that we study in this paper, over the past 25 years, nine in ten migrant workers are split migrants. About 47 per cent of them are women, and more than 66 per cent of them are mothers; more than 80 per cent of the female migrants go to the Middle East for work (Sri Lanka Bureau of Foreign Employment, 2018). Given the size of female migration from Sri Lanka, it is interesting to study the intra-household resource allocation decision, especially with respect to their husbands' labour market decisions.

This paper examines Sri Lankan men's labour market outcomes when their wives emigrate to work and leave the men and their children in Sri Lanka—the effects of maternal migration on the husbands' labour market decisions, which contributes to the literature on parental migration in three ways.

One, we examine the effects of maternal migration on the husbands' labour

market outcomes in the home country; to the best of our knowledge, no other paper has examined this research question. Two, we use instrumental-variable estimations to address the endogeneity of maternal migration. We use historical female migrant networks to instrument maternal migration and show that it meets relevance and exclusion restriction assumptions. Three, we examine migrants from Sri Lanka, where the number of female migrants is large (about 4 per cent of the population), and two-thirds of the female migrants are mothers—a unique population of migrants on which we can study the effects of maternal migration on the labour market decisions of their husbands in the home country.

We focus on Sri Lanka because many migrant mothers leave behind their husbands and children to work abroad. Sri Lanka is a lower-middle-income country where 22 per cent of the working-age population emigrate to work, half of whom are women (Wijayaweera, 2014). About two-thirds of the migrant women from Sri Lanka are mothers, representing about 31 per cent of all migrants from the country (Sri Lanka Bureau of Foreign Employment, 2018).

Examining husbands' labour market participation is interesting because the husbands of migrant mothers from Sri Lanka have an average of fewer than seven years of schooling (Table 1). The male labour force participation rate in Sri Lanka is about 75 per cent, but the rate is about 5-10 percentage points lower for men with less than ten years of schooling (based on Department of Census and Statistics data compiled from the quarterly Labour Force Survey). We examine only mothers, not all women, because the labour market decisions of women with and without children differ (Cortes, 2015). Due to patriarchal structures, mothers in developing countries (including Sri Lanka)

usually take care of their children. Hence, when they leave the country for work, the husbands may have to take over the childcare role. Couples without children need not worry about childcare arrangement, and therefore, are not part of our study.

Few papers examine the effects of female migration on their husband's labour market decisions, even fewer look at the impact of maternal migration. Most studies in the literature focus on the effect of remittances and do not estimate the effect of an individual's migration on spousal labour market decisions. Early studies that do not identify the effects of remittance by the gender of the migrants or that of the person whose labour market outcome is examined, such as Kim (2007) and Rodriguez and Tiongson (2001), find remittances, on average, reduce the labour supply of household members in the home countries.

Roth and Tiberti (2017), who use migration as the exogenous variation (instead of remittance), similarly find that international migration reduces the incentive to work among left behind Cambodian household members. The literature on the effects of migration and remittance on spousal work choices predominantly focuses on the effect of male migration on the females left behind; other papers look at the effects of migration in non-spousal terms, such as the effect of migration on women regardless of the women's relationship with the migrant. These papers find that remittances decrease female labour supply (sometimes favouring unpaid work) and change men's participation in the labour market from formal- to self-employment.

Lokshin and Glinskaya (2009), Binzel and Assaad (2011), and Mendola and Carletto (2012), for example, use a gendered approach. They find that remittances sent by male migrants reduce the labour supply of female household members in the home

countries. Wang (2016), on the other hand, finds that male domestic migration has little short-term impact on the labour market participation of left-behind women. Wang (2016), like our investigation, considers the absence of the migrant from the household but focuses on short-term internal migration of men rather than longer-term international migration of women. Wang also concludes that the need to replace the male migrants' labour supply in unpaid work makes left behind women fill in those roles previously taken up by the migrant men.

Acosta (2006) and Amuedo-Dorantes and Pozo (2006) studied the effects of remittances on male labour supply (irrespective of the gender and relationship to the migrants). While both studies do not find remittance affects male labour force participation, Amuedo-Dorantes and Pozo (2006) find that men are more likely to move away from formal sector work and urban self-employment towards work in the informal sector. The findings from studies focus on remittance receipt on spousal labour market decisions are not directly comparable to the research question we study, but they provide a good starting point.

We use a two-stage least squares estimation because maternal migration is endogenous. We use historical migrant networks, the proportion of female migrants in 1994 at the community level—six years before the data we use was collected—as an instrument for female migration. Migrant networks correlate with the probability of migrating because they provide access to market information and reduce setup and information costs for prospective migrants (Binzel & Assad, 2011) (the relevance assumption). Female migrant networks, unlike overall migrant networks, do not directly affect the local labour outcomes for men (exclusion restriction assumption).

We find Sri Lankan men reduce their labour supply when their wives emigrate to work. The husbands are three percentage points more likely to exit the labour market and six percentage points more likely to become unemployed; they are more likely to become homemakers, less likely to moonlight, and have lower monthly salaries. However, among husbands that work, we do not find evidence that maternal migration affects the type of work they do or the number of hours they work.

We proceed as follows: Section 2 describes the empirical strategy, Section 3 describes the data, Sections 4 and 5 discuss the results and robustness checks respectively, and Section 6 concludes.

2. Empirical Strategy

We want to estimate the effect of the wife's emigration abroad on their husband's labour market decision. Hence, we are interested in the following Equation[1]:

$$w_{ijk} = \alpha + \beta maternal\ migration_{ijk} + X\delta + \zeta_j + \varepsilon_{1ijk} \quad (1)$$

where w_{ijk} is a labour market decision of husband i living in district j and community k such as his participation in the labour market or the number of hours he works; $maternal\ migration_{ijk}$ is the migratory status of his wife, an indicator equals one if the wife is a migrant and zero otherwise; X is a vector of the individual- and household characteristics; ζ_j is district fixed-effects, which control for both observed, and unobserved time-invariant district-specific characteristics such as a district's labour

[1] Districts are the second level of administrative division in Sri Lanka; provinces are the first level. Sri Lanka, at the time of the survey, had eight provinces and 25 districts.

market conditions or networks of migrants from the district in the past; and ε_{1ijk} is the error term.

The key variable of interest is $maternal\ migration$. Under general equilibrium conditions, husbands may decrease their labour supply if their wives migrated abroad for work (Killingsworth, 1983). When their wives migrate abroad for work, the household generates higher income from the additional source of earnings. The absence of the wife is also likely to increase the reservation wage of the husbands, as child-rearing is expensive.

However, estimating the effect of maternal migration on the husband's labour supply decision using Equation (1) is likely to be endogenous because of selection, simultaneity, or reverse-causality problems. Migrant- and non-migrant households may differ across some unobservable characteristics. Women's decision to migrate and their husbands' labour supply may be affected by third factors such as a child's illness or the need to finance children's education. Some women migrate because their husbands are unemployed.

Due to these endogeneity concerns, we use instrumental-variable (IV) techniques to estimate the effects of maternal migration on the husbands' labour market decisions. We use the proportion of female migrants in a community in 1994, six years before data collection, as the proxy for migrant network effects. We argue that female migrant networks generate exogenous changes in the labour supply of the mothers to foreign labour markets—maternal migration [Papers that use this IV are, among others, Binzel & Assad (2011) and Lokshin & Glinskaya (2009)].

The instrumental variable may violate the exclusion restriction assumption if

some historic community characteristics directly affect the father's labour supply in the domestic market, but we do not find any related evidence. We show descriptive statistics across communities with relatively high female migration (>5%) and communities with relatively low female migration (<5%) (see Appendix A). The appendix shows differences in means across community characteristics such as access to facilities and internal migration in the community. However, we do not find differences in these communities across the variables we observe to be statistically significant.[2]

In the first stage, we estimate:

$$maternal\ migration_{ijk} = \gamma + \theta fmignetwork_{jk} + X\sigma + \zeta_j + \varepsilon_{2ijk} \quad (2)$$

where $maternal\ migration_{ijk}$ is the migratory status of the wives, an indicator equals one if the wife in household i is a migrant and zero otherwise. $fmignetwrok_{ijk}$ is the proportion of female migrants in district j and community k in 1994, and the coefficient θ is the effects of having access to female migrant networks on *maternal migration*.

In the second stage, we estimate Equation (1) using the predicted values of the migratory status of the wives from the first stage: We replace $maternal\ migration$ with $\widehat{maternal\ migration}$, because $\widehat{maternal\ migration}$ is the exogenous migration status of the wives, β is the causal effects of $maternal\ migration$ on the husbands' labour market outcomes.

[2] The evidence in Appendix A by itself does not establish the exclusion restriction assumption of the IV. However, due to the lack of female migrant network data that predates to earlier years, we argue that the proportion of female migrants in a community in 1994 is unlikely to correlate with community-level characteristics in 2000, which may affect male labour market outcomes.

3. Data

We use the cross-sectional Sri Lanka Integrated Survey (SLIS) 1999-2000, a representative survey of the Sri Lankan population, except for the Northern and Eastern regions where the then ongoing civil war disrupted data collections.[3] The survey includes 7,500 households and 35,181 individuals. We exclude male migrant households, so our control group has only non-migrant households. We also restrict our sample to married men between the ages of 21 and 60 with at least one child since we are interested in studying the effect of *maternal migration*.

We define the treatment variable, *maternal migration*, the migratory status of the wives, as an indicator that equals one if the wife emigrates abroad to work and zero otherwise. We used *out of the labour force* and *employed* as measures of the husbands' labour supply. *Out of the labour force* is an indicator that equals one if the husbands are out of the labour force (i.e., not actively looking for work) and zero otherwise; *employed* is an indicator equals one if the husbands are employed and zero otherwise (we include only those in the labour force).

We also use seven other measures of labour market outcomes. For those who do any work (including household chores), we employ four measures of types of work: *formal* (an indicator of formal employment), *informal* (an indicator of informal employment), *self-employed* (an indicator of self-employment), and *homemaker* (an

[3] While the SLIS was carried out about two decades ago, it is still the only nationally representative dataset that identifies individual migrants. Other national surveys do not explicitly identify migrants and are therefore not useful in studying the effect of migration on the spousal labour supply. Male and female migration from Sri Lanka has continued to persist over the last three decades (Sri Lanka Bureau of Foreign Employment, 2018), and therefore the dataset presents an important avenue to explore our research question.

indicator of being househusbands). For those who work in the labour market (formal and informal employment), we use three other measures of labour supply: *more than one job* (an indicator of moonlighting), *work hours* (the number of monthly work hours), and *monthly pay* (monthly income in Sri Lankan Rupees, which includes basic pay, perks, bonuses, and allowances).[4]

To make the exclusion restriction more likely to hold and increase the estimations' statistical power, we include individual-, household- and community characteristics as control variables. They are the age and educational attainment of the husband and wife, the number of children in the household, number of adults in the household, religion of the head of the household, and availability of a secondary school in the community where the household lives—each enter the regressions as a set of dummy variables.[5]

The summary statistics in Table 1 reveal that migrant- and non-migrant households do not differ much. The averages of age and years of schooling of the migrants and the husbands in the two groups of households are similar. Migrant- and non-migrant households also have similar size. We do not see significant differences in the proportions of migrant households by religion except for Hindus. A larger proportion of households

[4] Following Amuedo-Dorantes and Pozo (2006), we define formal-sector employment as paid work done under contracts with regular income streams. Informal sector employment is paid employment without contracts, often with irregular income streams. Homemakers do household work full time without pay, that is, stay at home and do household chores, do not work for pay in the labour market. All these are self-reported indicators.

[5] Including a control variable this way allows the relationships between the outcome and the control variable to take on whatever non-linear relationship that they have without assuming they have, for example, linear, quadratic, or cubic function.

in rural areas are migrant households, and the communities where migrant households live are less likely to have secondary schools. Still, the differences are small and, importantly, statistically insignificant.

We find husbands in migrant- and non-migrant households differ in some measures of labour outcomes. The husbands in migrant households are less likely to work, work in the formal sector, and do more than one job. They are more likely to be out of the labour force, and, for those out of the labour force, they are more likely to become homemakers. These differences, however, are statistically insignificant.

[Table 1 is about here]

4. Results

4.1. Basic results

Table 2 presents the first-stage regression: It shows that *fmignetwork* (female migrant network) predicts *maternal migration* well. Households in communities with higher proportions of female migrants in 1994 were more likely to send their females (mothers) to migrate for work. (The estimates in column 1 and column 2 with and without control variables, respectively, are statistically significant at the 0.1% level; the F-statistics are large; the adjusted R-squared are about 0.30-0.40). The positive association between female migrant networks and mother's emigration for work is expected: Migrant networks reduce information search cost and asymmetry of information between prospective migrants and their employers.

[Table 2 is about here]

Table 3, which presents the second-stage regressions, indicates maternal migration reduces the husbands' labour supply. A husband is three percentage points more likely to exit the labour market when his wife migrates abroad to work; they are also six percentage points less likely to work. The 2SLS estimates are similar, regardless of whether we control for household- and community characteristics (columns 3-4). The ordinary least squares (OLS) estimates (columns 1-2) are marginally smaller, though the OLS and 2SLS estimates may not statistically differ. These results align with the general equilibrium predictions and indicate that husbands reduce their labour supply when their wives migrate abroad for work.

[Table 3 is about here]

Among husbands who do any work (including household chores), we find maternal migration makes them more likely to become homemakers.[6] This denotes that husbands possibly exit the labour market because their reservation wage is higher due to child-rearing costs in the absence of their wives. Husbands quit the labour market and become househusbands. However, we do not find evidence that maternal migration affects the likelihood that the men work in the formal or informal sector or self-employment (Panel A of Table 4). (We present only the 2SLS estimates for brevity).

Maternal migration makes the husbands about three percentage points more likely to become homemakers and seven percentage points less likely to work in the formal

[6] This result seems to apply to households with few adults. In specifications in which we interact the endogenous- and the instrumental variables with the number of adults (that is, a set of dummies for the number of adults that a household has other than the husband and his wife), we find the interactive terms are positive, but they are statistically significant only for households with one or two other adults.

sector. However, the estimates of the latter are statistically insignificant. The estimates of the effects on working in the informal sector and self-employment are statistically insignificant, with standard errors larger than the coefficients.

We also find maternal migration reduces husbands' wages and the likelihood that they do more than one job (Panel B of Table 4). Maternal migration makes the husbands eight-percentage points less likely to do more than one job and reduces monthly take-home pay by 16 per cent (column 2). Maternal migration seems to reduce monthly working hours too, but the estimates are statistically insignificant.

[Table 4 is about here]

Maternal migration reduces the husbands' labour supply; the husbands were more likely to exit the labour market. If they remain in the labour market, they are less likely to be employed. Among those who do any work, the husbands are more likely to become homemakers and less likely to moonlight. There is also some evidence that these husbands have lower monthly take-home pay than husbands whose wives remain in the country. [7]

These findings differ from those in the literature, perhaps because we examine the effects of maternal migration on the husbands' labour supply, not just the effects of the migration of some household members on the labour supply of other household members

[7] We also estimate these specifications using IV tobit to use the entire sample. As Appendix C shows, we find similar estimates to those estimated using 2SLS (presented in Table 4). Additionally, we estimate these specifications with all married men (irrespective of whether they have children or not) in the sample. The estimates of the coefficient of *migrant wife* on all labour market outcome variables become statistically not significant. We do not report these results here for the sake of brevity.

in the home country. Amuedo-Dorantes and Pozo (2006) and Acosta (2006), for example, do not find remittances affecting the mens' labour market participation in the home countries, but they do not consider the relationship between the migrants and the people whose labour supply they examine.

Amuedo-Dorantes and Pozo (2006) find migration induces household members in the home country to move from the formal to the informal sector, which again differs from our findings. [Amuedo-Dorantes & Pozo (2006) and Acosta (2006) examine the cases of Mexico and El Salvador, whose migration flow is dominated by male migration; their results, therefore, are not the effects of maternal migration on the husbands' labour supply].

Our results are somewhat similar to Wang (2016). While Wang finds limited effect of male domestic migration on female labour supply, she concludes that women take unpaid work to substitute for the male migrants. Our results also produce a similar story: Male spouses are more likely to take care of children and attend household chores in the absence of female migrants.

5. Robustness

5.1. Using another instrumental variable

As robustness checks, we use the presence of foreign-employment agencies in the past in the community where a household lives as an instrumental variable for maternal migration. We match the addresses of foreign-employment agencies in 1995, obtained from Sri Lanka's Association of Licensed Foreign Employment Agents, with the

communities where the households in the sample lived in 2000.[8] We define the instrumental variable equals to one if there were foreign-employment agencies in a community in 1995 and zero otherwise.

The presence of foreign-employment agencies in the past predicts maternal migration because the agencies help migrants to find jobs abroad, mediate them with prospective employers, prepare contracts on behalf of the migrants, and arrange the necessary travel documents—services that many Sri Lankan female migrant workers use.

According to the Sri Lanka Bureau of Foreign Employment (2018), three in four Sri Lankan female migrants in the past fifteen years have used the agencies' services. Sarma and Parinduri (2016) and Gamburd (2000) show that the presence of foreign-employment agencies increases the likelihood of parental migration. In this paper, we use the same variable as an instrumental variable for maternal migration. The variable *agencies* is similar to migrant networks that past studies such as Munshi (2003), Hanson and Woodruff (2003), and McKenzie and Rapoport (2007) use to instrument for migration.

We estimate similar 2SLS regressions; the only difference is we use *agencies*, an indicator for the presence of foreign-employment agencies, instead of *fmignetwork,* as an instrumental variable in the first-stage regression.

Agencies predicts maternal migration well (the instrument is relevant) (Table 5). While we cannot test whether *agencies* affect the husbands' labour supply only through

[8] Communities in the survey are the World Bank defined stratum aligned with the District Secretariat Divisions (DSD), the third level administrative divisions in Sri Lanka.

maternal migration (the exclusion restriction), we do not find communities with- and those without foreign-employment agencies systematically differ in 1995, at least along the household- and community characteristics whose data are available (Appendix B). There is no evidence to indicate that foreign-employment agencies are more likely to operate in less developed communities or that many households in Sri Lanka internally migrate to communities with foreign-employment agencies to work abroad. (Panel A shows both types of communities have had schools and health facilities for 50 and 31 years, respectively; only one in fifty households have migrated within Sri Lanka since 1995—the figures are the same in both communities with and without foreign-employment agencies).

Communities with and without foreign-employment agencies do not seem to systematically differ either as their characteristics in 2000 indicate. Panel B shows communities with foreign-employment agencies are more likely to have schools in 2000, but they are less likely to have health facilities, banks, or markets; more importantly, the differences do not differ statistically. Even the characteristics of the households (Panel C) and those of the work choices (Panel D) in 2000 do not statistically differ, except that husbands in communities with agencies work for about 10 hours more per month than husbands in communities without agencies.

[Table 5 is about here]

Table 5, which presents the first- and second- stage estimates, shows that *agencies* predicts *maternal migration* well—the instrumental variable is relevant. The first stage estimates show living in a community with foreign-employment agencies increases the

likelihood of maternal migration by 16 percentage points (columns 1-2). The estimates are statistically significant at the 0.1% level.

The second-stage estimates—the magnitude, sign, and statistical significance—are similar to those in Tables 3 and 4. Husbands of migrant wives are three percentage points more likely to exit the labour market, six percentage points more likely to be unemployed, three percentage points more likely to be homemakers, and eight percentage points less likely to do more than one job. They have 16% lower monthly salaries on average. The effects on other measures of labour supply are similar to those in Table 4, both the sign and the magnitude, but they are statistically insignificant (we do not present these estimates for the sake of brevity.)

We then run 2SLS specifications with both *agencies* and *fmignetwork* as IVs and find similar results. We present the first- and second- stage estimates using both *agencies* and *fmignetwork* as instruments in Appendix D.[9]

5.2. The effects of maternal migration by urban and rural area

We do not find evidence that the effects of maternal migration on husbands in urban and rural areas differ (Appendix F). The signs and magnitude of estimates in urban and rural areas are similar to estimates in Tables 3-4. Some estimates become statistically insignificant, but that is perhaps due to the small sample size. We should, however,

[9] Because some of our outcome variables are dummy variables, we also use an IV probit estimation strategy. We compare these IV probit estimates to those of the 2SLS estimates in Appendix E. We find the estimates of the marginal effects from IV probit and 2SLS estimates to be similar.

cautiously interpret these estimates because we make multiple comparisons; some estimates are statistically insignificant if we use the Bonferroni correction[10].

Our findings on the effects of migration on spousal labour market outcomes in urban or rural areas differ from, for example, Amuedo-Dorantes and Pozo's (2006) and Binzel and Assad's (2011). Amuedo-Dorantes and Pozo (2006) find women in rural areas were less likely to work in the labour market if the household receives remittance. They also find self-employment is expected to decrease only for males in urban areas. Binzel and Assad (2011) find women in rural areas (whose husbands are migrants) are more likely to do unpaid and subsistence work. These studies primarily focus on the left behind women's labour market decisions, whereas we focus on the effect of maternal migration on the left-behind husband's labour market decisions.

6. Conclusion

When married Sri Lankan women with children emigrate to work, their husbands reduce their labour supply; these results are applicable to husbands living in both urban and rural areas. The husbands are three percentage points more likely to exit the labour market and six percentage points more likely to become unemployed. The employed are eight percentage points less likely to moonlight and have about 16 per cent lower monthly salary on average. Many that exit the labour market become stay-at-home dads. However,

[10] The Bonferroni correction tests each individual hypothesis in a setting of multiple hypotheses by setting a significance level of desired alpha divided by the number of hypotheses (Miller, 2012).

we do not find maternal migration affects whether the husbands work in the formal sector, informal sector, or the self-employed.

We suggest two explanations for the adverse effects of maternal migration on the husbands' labour supply: *reservation wage* and *childcare*. First, remittances that the husbands receive from their wives increase the reservation wages of the husbands (Killingsworth, 1983), and husbands, therefore, lower their labour market participation and do less moonlighting. There is support for this channel in the literature: Gamburd (2008) finds that husbands in female migrant households made poor money-management decisions in the absence of their wife. Findings in Athauda and Fernando (2002) further indicate that husbands in female migrant households were more likely to smoke, consume alcohol, and use drugs than husbands in households where the wife was in Sri Lanka. Our data also suggest that husbands of migrant women increase spending on alcohol by 122%, on average. These findings indicate that the remittance income and absence of the wife increased the reservation wage of the husbands, who were therefore more likely to reduce their labour supply.

Two, the absence of the wives at home increases the opportunity cost of working, because somebody has to take care of the children and do household chores, which makes the husbands more likely to leave the labour market and become homemakers. There is support for this channel in the literature as well: Sarma and Parinduri (2015) report that women from Sri Lanka were more likely to migrate abroad for work when they have more children—since it enables them to earn wages that are 5-10 times those available in Sri Lanka and support their children better. Siriwardhana et al. (2015) show that these higher remittances sent by the wives allowed husbands to stay at home and care for the

children (improved child education and welfare is a key motive for parental migration; Gamburd (2008)). Gamburd (2008) further indicates that that such childcare arrangements were part of the maternal migration decision, allowing wives to become breadwinners of the family.[11]

These results indicate that remittance income received from migrant Sri Lankan mothers may not be an exogenous source of income. Further, for the migratory exercise to be fruitful for the migrant's family, the remittances earned by the female migrant has to offset the costs of accessing foreign labour markets and any lost income from the husbands reducing their labour supply. Therefore, policies aimed at female migrants in countries like Sri Lanka, which do not account for spousal labour supply effects, may at least be partly impaired.

Even though our results are the effects of maternal migration induced by female migrant networks, we think our results can be generalised. One, female migrant networks are a strong predictor of maternal migration. Two, our results are robust when we use another instrumental variable—whether a community has a foreign-employment agency. Three, our results are also robust to geographical classification into urban and rural areas. Our results, therefore, may apply to countries whose stage of development is similar to Sri Lanka in the early 2000s.

[11] Gamburd (2008) and Sarma and Parinduri (2016), however, argue that although husbands stay back to take care of the children, the children are actually worse off in their educational outcomes due to the absence of their mother and change in childcare roles.

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Table 1: Descriptive statistics

	Female migrant household	Non migrant household	Difference in means
	(1)	(2)	
A. Outcomes			
Out of labour force (1 if out of the labour force)	0.10	0.14	-0.04
	(0.30)	(0.34)	(0.06)
Employed (1 if working)	0.88	0.91	-0.03
	(0.28)	(0.31)	(0.05)
Formal (1 if employed in the formal sector)	0.15	0.32	-0.17
	(0.36)	(0.44)	(0.10)
Informal (1 if employed in the informal sector)	0.39	0.30	0.09
	(0.49)	(0.46)	(0.05)
Self (1 if self-employed including farming)	0.42	0.38	0.04
	(0.48)	(0.54)	(0.08)
Homemaker (1 if attending to household chores)	0.04	0.01	0.03
	(0.07)	(0.12)	(0.06)
More than one job (1 if more than one job)	0.03	0.08	-0.05
	(0.17)	(0.27)	(0.12)
Hours (monthly average)	144.26	160.46	-16.20
	(114.78)	(119.64)	(8.75)
Monthly pay (in LKR 2000 rates)	8,248.18	11,463.28	-3,215.10
	(9,488.37)	(14,892.62)	(7,025.55)
B. Characteristics			
Age	37.79	39.46	-1.67
	(7.69)	(9.24)	(1.98)
Years of schooling	6.60	7.82	-1.22
	(3.30)	(3.78)	(0.77)
Spouse's age	33.84	33.18	0.66
	(7.94)	(8.96)	(1.12)
Spouse's years of schooling	7.64	8.61	-0.97
	(3.44)	(3.96)	(0.68)

	Female migrant household	Non migrant household	
	(1)	(2)	
Number of children in household	1.79	1.73	0.06
	(1.06)	(1.12)	(0.07)
Number of adults in household	2.20	2.32	-0.12
	(2.22)	(2.59)	(0.47)
Buddhist	0.72	0.62	0.10
	(0.26)	(0.31)	(0.07)
Hindu	0.09	0.18	-0.09
	(0.29)	(0.39)	(0.11)
Muslim	0.11	0.10	0.01
	(0.28)	(0.34)	(0.08)
Christian	0.07	0.07	0.00
	(0.27)	(0.36)	(0.10)
Rural	0.85	0.78	0.07
	(0.33)	(0.39)	(0.08)
Secondary school (1 if available in community)	0.39	0.42	-0.03
	(0.37)	(0.39)	(0.03)
Share of female migrants (IV)	0.07	0.02	0.05**
	(0.03)	(0.04)	(0.02)

Note: Numbers in parentheses are standard deviations. The asterisks ** indicates statistical significance in the difference in means at the 1% level.The number of observations for *out of labour force is* 197 for female migrant households and 5,424 for non migrant households. For the rest of the variables, the number of observations is 171 and 4,718 respectively for female migrant households and non migrant households. The labour market outcomes variables, age, education etc. refer to that of the husband (our unit of analysis) and the spouse refers to his wife. The number of adults in the household counts the individual (husband), but migrant spouses who are not present in the household are not counted.

Table 2: First- stage estimates of *migrant wife* using female migrant networks as an instrument

	(1)	(2)
Panel A: First-stage		
IV: *fmigetwork*	0.124***	0.113***
	(0.031)	(0.031)
F-Statistic	20.26	24.06
Adjusted-R^2	0.312	0.386
Control variables		✓
Observations	5,621	5,621

Note: Column one presents the estimate of *Migrant wife* on the instrument *fmignetwork*, column two presents the esitmates with the inclusion of district fixed-effects and other covariates. Other covariates include dummies for the age and educational attainment of the individual and his spouse, the number of children and adults in the household, dummies for religion and availability of a secondary school in the community. *Migrant wife* equals one if the spouse of the individual migrated abroad for work. *fmignetwork* is the proportion of female migrant households in a community. The sample includes married men with at least one child. Robust standard errors are in parentheses clustered at the community level; the signs ***, **, * indicate statistical significance at the 0.1%, 1% and 5% levels respectively.

Table 3: Second stage estimates of any work

	OLS		2SLS	
	(1)	(2)	(3)	(4)
Dependant variable: *Out of labour force*				
Migrant wife	0.032*	0.029*	0.034*	0.032*
	(0.015)	(0.014)	(0.016)	(0.016)
Observations	5,621	5,621	5,621	5,621
Adjusted-R^2	0.193	0.228	0.274	0.281
Dependant variable: *Employed*				
Migrant wife	-0.062*	-0.057*	-0.063*	-0.062*
	(0.030)	(0.029)	(0.031)	(0.031)
Observations	4,889	4,889	4,889	4,889
Adjusted-R^2	0.179	0.215	0.288	0.307
Control variables		✓		✓

Note: Each cell is the estimate of *out of labour force* on migrant wife in panel A and, estimate of *Employed* on *migrant wife* in panel B, using *fmignetwork* as the instrument, district fixed-effects and other covariates—dummies for the age and educational attainment of the individual and his spouse, the number of children and adults in the household, dummies for religion and availability of a secondary school in the community. *Out of labour force* equals one if the individual is not actively looking for work; *Employed* only includes the sample of those in the labour force and takes a value of one if the individual is employed; *Migrant wife* equals one if the spouse of the individual migrated abroad for work. The sample includes all married men with at least one child in Panel A, and only those who are working in Panel B. Robust standard errors are in parentheses clustered at the community level; the sign * indicates statistical significance at the 5% level.

Table 4: 2SLS estimates of other types of work and work attributes

Dependent variable		(1)	(2)
Panel A: Type of work			
Formal	(1)	-0.074	-0.071
		(0.052)	(0.051)
Informal	(2)	0.021	0.016
		(0.068)	(0.061)
Self	(3)	0.026	0.022
		(0.065)	(0.061)
Homemaker	(4)	0.041***	0.032***
		(0.007)	(0.006)
Observations		4,627	4,627
Panel B: Work attributes			
More than one job	(5)	-0.089**	-0.083**
		(0.034)	(0.032)
Hours	(6)	-7.874	-6.153
		(8.567)	(7.994)
Log monthly pay	(7)	-0.183*	-0.162*
		(0.082)	(0.081)
Control variables			✓
Observations		4,516	4,516

Note: Each row identifies the estimation of the dependent variable listed in the column to the left on *migrant wife*, using *female migrant networks* as the instrument, district fixed effects and other covariates—age and educational attainment of the individual and his spouse, the number of children and adults in the household, religion and availability of a secondary school in the community. The sample for Panel A includes those who are *homemakers* (househusbands); because work attributes are not available for this activity, we exclude *homemakers* from the sample in Panel B. Robust standard errors are in parentheses clustered at the community level; the signs ***, **, * indicate statistical significance at the 0.1%, 1% and 5% levels respectively.

Table 5: First stage and second estimates using agencies as the instrument

Dependent variable:	Migrant wife	Migrant wife	Out of labour force	Employed	Homemaker	More than one job	Log monthly pay
	First stage (1)	*First Stage* (2)	*Second stage* (3)	*Second stage* (4)	*Second stage* (5)	*Second stage* (6)	*Second stage* (7)
Agencies	0.162***	0.156***					
	(0.011)	(0.011)					
Migrant wife			0.030*	-0.059*	0.029***	-0.078*	-0.157*
			(0.014)	(0.027)	(0.006)	(0.031)	(0.079)
Control variables		✓	✓	✓	✓	✓	✓
Observations	5,621	5,621	5,621	4,889	4,627	4,516	4,516
Adjusted-R^2	0.312	0.347	0.272	0.286	0.347	0.148	0.387

Note: Columns (1)-(2) present the first stage estimates of *Migrant wife* on *agencies*. *Migrant wife* equals one if the spouse of the individual migrated abroad for work; *Agencies* equals one if the household lived in a community with at least one foreign employment agency and zero otherwise. Columns (3)-(7) present the second stage estimates of the type of work listed at the top of each column (3)-(7) on *migrant wife*, using *agencies* as the instrument. Specifications (2)-(7) include district fixed-effects and other covariates—dummies for the age and educational attainment of the individual and his spouse, the number of children and adults in the household, dummies for religion and availability of a secondary school in the community. The sample used in Columns (1)-(3) estimates include all married men with at least one child (regardless of whether they are working/ actively looking for work), that in Column 4 excludes those who are not actively looking for work but includes those who are unemployed, that in Column 5 includes working individuals and homemakers, those in Columns 6 and 7 only include working individuals and excludes househusbands. Robust standard errors are in parentheses clustered at the community level; the signs ***, ** and * indicate statistical significance at the 0.1%, 1% and 5% levels, respectively.

Appendix A: Descriptive statistics for communities by proportion of female migrants

	More than 5% female migration (1)	Less than 5% female migration (2)	Differences in means
A. Access to facilities and migration in the past			
Community is better off than ten years ago (Yes=1)	0.81	0.86	-0.05
	(0.26)	(0.30)	(0.06)
Years of operation of oldest school in the community	51.06	49.65	1.41
	(38.74)	(39.66)	(1.24)
Years of operation of oldest health facility in the community	30.82	30.78	0.04
	(25.88)	(26.14)	(0.46)
Migrated internally since 1995 (Yes=1)	0.02	0.02	0.00
	(0.13)	(0.12)	(0.01)
B. Current access to facilities			
Primary schools	0.56	0.55	0.01
	(0.47)	(0.50)	(0.04)
Secondary schools	0.42	0.41	0.01
	(0.46)	(0.48)	(0.03)
Health centres	0.41	0.43	-0.02
	(0.49)	(0.52)	(0.04)
Public health care facilities	0.17	0.18	-0.01
	(0.36)	(0.37)	(0.02)
Private health care facilities	0.31	0.33	-0.02
	(0.46)	(0.47)	(0.03)
Main roads	0.69	0.68	0.01
	(0.46)	(0.47)	(0.01)
Post offices	0.39	0.40	-0.01
	(0.49)	(0.50)	(0.02)
Banks	0.26	0.27	-0.01
	(0.40)	(0.44)	(0.06)
Markets	0.19	0.23	-0.04
	(0.34)	(0.40)	(0.07)
Bus stops	0.28	0.31	-0.03
	(0.37)	(0.44)	(0.09)
Local administrative offices	0.95	0.94	0.01
	(0.21)	(0.22)	(0.02)

Appendix A: Descriptive statistics for communities by proportion of female migrants (continued...)

	More than 5% female migration (1)	Less than 5% female migration (2)	Differences in means
C. Parental and household characteristics			
Father's age	37.68	38.97	-1.29
	(7.56)	(8.04)	(0.83)
Mother's age	34.16	34.11	-0.05
	(7.23)	(7.88)	(0.81)
Father's years of schooling	7.82	7.86	-0.04
	(3.16)	(3.28)	(0.19)
Mother's years of schooling	8.18	8.24	-0.06
	(3.18)	(3.27)	(0.16)
Total number of children in household	1.83	1.78	0.05
	(1.18)	(1.08)	(0.14)
Total number of adults in household	2.17	2.25	-0.08
	(2.16)	(2.31)	(0.23)
Buddhist (=1 if Buddhist)	0.74	0.71	0.03
	(0.32)	(0.36)	(0.06)
Hindu (=1 if Hindu)	0.08	0.12	-0.04
	(0.36)	(0.41)	(0.07)
Muslim (=1 if Muslim)	0.13	0.09	0.04
	(0.32)	(0.37)	(0.07)
Christian (=1 if Christian)	0.05	0.08	-0.03
	(0.22)	(0.27)	(0.07)
Paternal migrant households	0.01	0.02	-0.01
	(0.01)	(0.03)	(0.03)
Maternal migrant households	0.09	0.02	0.07***
	(0.03)	(0.04)	(0.01)

Appendix A: Descriptive statistics for communities by proportion of female migrants (continued...)

	More than 5% female migration (1)	Less than 5% female migration (2)	Differences in means
D. Husband's labour market outcomes			
Out of labour force	0.10	0.08	0.02
	(0.04)	(0.06)	(0.03)
Formal	0.22	0.30	-0.08
	(0.35)	(0.40)	(0.07)
Informal	0.35	0.32	0.03
	(0.46)	(0.48)	(0.03)
Self employed	0.41	0.37	0.04
	(0.44)	(0.50)	(0.07)
Homemaker	0.04	0.01	0.03
	(0.05)	(0.09)	(0.04)
More than one job	0.09	0.07	0.02
	(0.22)	(0.25)	(0.04)
Hours	138.21	156.25	-18.04
	(100.93)	(127.83)	(32.26)
Monthly pay	8,892.52	9,862.48	-969.96
	(12,642.78)	(15,289.64)	(2382.17)
Hourly pay	64.34	63.11	1.23
	(128.78)	(152.14)	(25.67)
Observations	77	342	

Notes: Numbers in parentheses are standard deviations. The asterisks *** indicate statistical significance in the difference in means at the 0.1% level. Each variable in panel B is a dummy variable that is equal to one if the community had that particular facility and zero otherwise.

Appendix B: Descriptive statistics for communities with and without agencies

	Agencies=1 (1)	Agencies=0 (2)	Differences in means
A. Access to facilities and migration in the past			
Community is better off than ten years ago (Yes=1)	0.83	0.85	-0.02
	(0.28)	(0.26)	(0.03)
Years of operation of oldest school in the community	51.23	49.54	1.69
	(39.28)	(36.33)	(3.88)
Years of operation of oldest health facility in the community	30.83	30.76	0.07
	(25.94)	(25.93)	(2.70)
Migrated internally since 1995 (Yes=1)	0.02	0.02	0.003
	(0.13)	(0.12)	(0.011)
B. Current access to facilities			
Primary schools	0.57	0.55	0.02
	(0.48)	(0.49)	(0.05)
Secondary schools	0.43	0.41	0.02
	(0.49)	(0.48)	(0.05)
Health centres	0.42	0.43	-0.01
	(0.49)	(0.50)	(0.05)
Public health care facilities	0.16	0.18	-0.02
	(0.35)	(0.37)	(0.04)
Private health care facilities	0.32	0.33	-0.01
	(0.47)	(0.47)	(0.05)
Main roads	0.68	0.68	0.002
	(0.47)	(0.47)	(0.048)
Post offices	0.38	0.41	-0.03
	(0.48)	(0.50)	(0.05)
Banks	0.25	0.27	-0.02
	(0.43)	(0.44)	(0.05)
Markets	0.20	0.22	-0.02
	(0.38)	(0.39)	(0.04)
Bus stops	0.30	0.31	-0.01
	(0.42)	(0.43)	(0.04)
Local administrative offices	0.94	0.94	0.004
	(0.22)	(0.21)	(0.022)

Appendix B: Descriptive statistics for communities with and without agencies (continued…)

	Agencies=1 (1)	Agencies=0 (2)	Difference in means
C. Parental and household characteristics			
Father's age	38.73	38.96	-0.23
	(7.44)	(7.63)	(0.79)
Mother's age	34.08	34.13	-0.05
	(7.12)	(7.24)	(0.75)
Father's years of schooling	7.88	7.80	0.08
	(3.18)	(3.15)	(0.33)
Mother's years of schooling	8.26	8.19	0.07
	(3.18)	(3.17)	(0.33)
Total number of children in household	1.82	1.79	0.03
	(1.05)	(1.04)	(0.11)
Total number of adults in household	2.19	2.24	-0.05
	(2.19)	(2.20)	(0.23)
Buddhist (=1 if Buddhist)	0.68	0.70	-0.02
	(0.33)	(0.34)	(0.04)
Hindu (=1 if Hindu)	0.13	0.12	0.01
	(0.37)	(0.39)	(0.04)
Muslim (=1 if Muslim)	0.11	0.09	0.02
	(0.33)	(0.34)	(0.04)
Christian (=1 if Christian)	0.08	0.09	-0.01
	(0.25)	(0.26)	(0.03)
Paternal migrant households	0.04	0.02	0.02***
	(0.02)	(0.02)	(0.008)
Maternal migrant households	0.06	0.02	0.04***
	(0.04)	(0.04)	(0.006)

Appendix B: Descriptive statistics for communities with and without agencies (continued…)

	Agencies=1 (1)	Agencies=0 (2)	Difference in means
D. Husband's labour market outcomes			
Out of labour force	0.09	0.08	0.01
	(0.05)	(0.05)	(0.01)
Formal	0.26	0.29	-0.03
	(0.38)	(0.39)	(0.02)
Informal	0.34	0.32	0.02
	(0.48)	(0.47)	(0.02)
Self employed	0.39	0.38	0.01
	(0.49)	(0.47)	(0.02)
Homemaker	0.01	0.01	0.00
	(0.08)	(0.08)	(0.01)
More than one job	0.06	0.07	0.01
	(0.24)	(0.24)	(0.02)
Hours	143.64	154.37	-10.73*
	(103.88)	(101.34)	(5.28)
Monthly pay	9,148.64	9,652.22	-503.58
	(14,454.85)	(14,671.37)	(389.74)
Hourly pay	63.69	62.53	1.16
	(139.15)	(144.77)	(5.11)
Observations	138	281	

Notes: Numbers in parentheses are standard deviations. The asterisks *** and * indicates statistical significance in the difference in means at the 0.1% and 5% levels respectively. Each variable in panel B is a dummy variable that is equal to one if the community had that particular facility and zero otherwise.

Appendix C: IV tobit estimates of other types of work and work attributes

Dependent variable		(1)	(2)
Panel A: Type of work			
Formal	(1)	-0.078	-0.073
		(0.053)	(0.052)
Informal	(2)	0.023	0.018
		(0.070)	(0.064)
Self	(3)	0.029	0.024
		(0.069)	(0.064)
Homemaker	(4)	0.046***	0.038***
		(0.008)	(0.007)
Panel B: Work attributes			
More than one job	(5)	-0.084*	-0.081*
		(0.035)	(0.034)
Hours	(6)	-7.261	-5.886
		(8.891)	(8.107)
Log monthly pay	(7)	-0.179*	-0.159*
		(0.083)	(0.081)
Control variables			✓
Observations		4,627	4,627

Note: Each cell is the marginal effect of IV tobit of the dependent variable listed in the column to the left on *migrant wife*, using *female migrant networks* as the instrument, district fixed effects and other covariates—age and educational attainment of the individual and his spouse, the number of children and adults in the household, religion and availability of a secondary school in the community. The signs ***, **, * indicate statistical significance at the 0.1%, 1% and 5% levels respectively.

Appendix D: First- and second stage estimates of agencies and female migrant networks on maternal migration

Dependent variable:	Migrant wife	Migrant wife	Out of labour force	Employed	Homemaker	More than one job	Log monthly pay
	First stage (1)	*First Stage* (2)	*Second stage* (3)	*Second stage* (4)	*Second stage* (5)	*Second stage* (6)	*Second stage* (7)
Agencies	0.141***	0.138***					
	(0.012)	(0.012)					
fmignetwork	0.121***	0.111***					
	(0.031)	(0.031)					
Migrant wife			0.036*	-0.068*	0.036***	-0.107**	-0.171*
			(0.018)	(0.033)	(0.006)	(0.033)	(0.082)
Control variables		✓	✓	✓	✓	✓	✓
Observations	5,621	5,621	5,621	4,889	4,627	4,516	4,516
Adjusted-R^2	0.381	0.403	0.318	0.321	0.404	0.156	0.429

Note: Columns (1)-(2) present the first stage estimates of *Migrant wife* on *agencies* and *fmignetwork*. *Migrant wife* equals one if the spouse of the individual migrated abroad for work; *Agencies* equals one if the household lived in a community with at least one foreign employment agency and zero otherwise; *fmignetwork* is the proportion of female migrant households in a community. Columns (3)-(7) present the second stage estimates of the type of work listed at the top of each column (3)-(7) on *migrant wife*, using *agencies* and *fmignetwork* as instruments. Specifications (2)-(7) include district fixed-effects and other covariates—dummies for the age and educational attainment of the individual and his spouse, the number of children and adults in the household, dummies for religion and availability of a secondary school in the community. The sample used in Columns (1)-(3) estimates include all married men with at least one child (regardless of whether they are working/ actively looking for work), that in Column 4 excludes those who are not actively looking for work but includes those who are unemployed, that in Column 5 includes working individuals and homemakers, those in Columns 6 and 7 only include working individuals and excludes househusbands. Robust standard errors are in parentheses clustered at the community level; the signs ***, ** and * indicate statistical significance at the 0.1%, 1% and 5% levels, respectively.

Appendix E: Second stage estimates of any work using IV probit

	Out of labour force	Employed	Homemaker	More than one job
2SLS	0.032*	0.062*	0.032***	-0.083**
	(0.016)	(0.031)	(0.006)	(0.032)
IV probit	0.031*	0.058*	0.029***	-0.077**
	(0.014)	(0.027)	(0.006)	(0.026)
Observations	5,621	4,889	4,627	4,516

Note: Each cell is the marginal effect of the IV probit estimate of the dependent variable identified as column headings, on migrant wife, using *fmignetwork* as the instrument. The specifications include district fixed-effects and other covariates—dummies for the age and educational attainment of the individual and his spouse, the number of children and adults in the household, dummies for religion and availability of a secondary school in the community. The sign * indicates statistical significance at the 5% level.

Appendix F: 2SLS estimates for urban and rural samples

Dependent variable		Rural (1)	Urban (2)
Out of labour force	(1)	0.032	0.035*
		(0.017)	(0.016)
Employed	(2)	-0.074*	-0.060
		(0.033)	(0.032)
Formal	(3)	-0.072	-0.084*
		(0.044)	(0.041)
Informal	(4)	0.020	0.017
		(0.069)	(0.061)
Self	(5)	0.027	0.036
		(0.066)	(0.069)
Homemaker	(6)	0.044***	0.033***
		(0.007)	(0.008)
More than one job	(7)	-0.086**	-0.081*
		(0.033)	(0.033)
Hours	(8)	-7.689	-7.537
		(9.651)	(9.432)
Log monthly pay	(9)	-0.190*	-0.194**
		(0.074)	(0.075)
Log hourly pay	(10)	-0.115	-0.113
		(0.085)	(0.084)

Note: Each row identifies the estimation of the dependent variable listed in the column to the left on *migrant wife*, using *fmignetwork* and *agencies* as instruments, district fixed effects and other covariates—age and educational attainment of the individual and his spouse, the number of children and adults in the household, religion, and availability of a secondary school in the community. Robust standard errors are in parentheses clustered at the community level; the signs ***, ** and * indicate statistical significance at the 0.1%, 1% and 5% levels, respectively.