

Is Economic Growth Good for Women's Empowerment Within the Household?

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Abstract

Economic growth can generate employment opportunities for women and improve their bargaining power within the household. However, it can also have negative consequences for women's empowerment if the patterns of growth generate forms of employment that favor male workers. In addition, little is known about which economic sectors positively or negatively affect women's empowerment within the household. This paper analyzes the effect of economic growth on women's empowerment within the household in Mexico. The empowerment of women is measured through three dimensions: personal freedom, perception of gender roles, and participation in household decisions. Using three samples taken from 2006 to 2016 of a national-state representative survey specializing in women's empowerment, economic growth at the sector level, and state fixed-effects models, the results indicate the following: (1) economic growth in the construction sector increased women's personal freedom; (2) economic growth in cultural services decreased the perception of gender roles that favor men; (3) economic growth in the transportation sector increased the participation of women in household decisions; and (4) evidence of heterogeneous effects whose main beneficiaries were less educated and indigenous women. As a robustness test for unobserved time-variant variables, a bounding strategy was applied following [Oster \(2017\)](#). In addition, an instrumental variable approach was conducted following [Lewbel \(2012\)](#) to test for reverse causality. The outcomes of the bounding and instrumental variable strategies suggest that the results are robust to the aforementioned econometric problems.

Keywords: GDP; personal freedom; gender roles; household decisions.

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1 Introduction

Can economic growth improve women's empowerment within the household? [Duflo \(2012\)](#) suggests that economic growth can generate employment opportunities for women, improve their income, and increase their bargaining power within the household. However, some scholars, such as [Kabeer \(2016\)](#) argue that economic growth will have little or no impact on women's empowerment because there is no guarantee that it will reduce the social norms that create inequalities in the first place. Likewise, [Moghadam \(2003\)](#) mentions that the sexual division of labor, which has historically affected women, can have negative consequences for women's empowerment if the patterns of growth generate forms of employment that favor male workers.

The current paper analyzes the effects of economic growth on women's empowerment within the household. The data were taken from the 2006, 2011 and 2016 National Survey on Relationships within the Household (ENDIREH), a national-state representative survey regarding women's empowerment in Mexico. Specifically, three measures of women's empowerment were used, namely, personal freedom, perception of gender roles, and participation in household decisions. Using fixed effects at the state level, the study finds that: (1) economic growth in the construction sector increased women's personal freedom by 0.03 standard devia-

tions.¹ (2) The economic growth of cultural services decreased the perception of gender roles that favor men by 0.06 standard deviations, and increased the participation of women in household decisions by 0.07 standard deviations. (3) Economic growth in the transportation sector increased women's participation in household decisions by 0.04 standard deviations. (4) Indigenous and less educated women were found to be the ones who obtained more benefits from economic growth in the latter sectors. As a robustness test for omitted variable bias, a bounding strategy was used following [Altonji et al. \(2005\)](#) and [Oster \(2017\)](#). In addition, an instrumental variable approach was conducted following [Lewbel \(2012\)](#) to check for reverse causality. The outcomes of the bounding and instrumental variable strategies suggest that the results are robust to the aforementioned econometric problems.

This work relates to a small body of literature studying the effects of economic growth on women's empowerment within the household. Using data from the Demographic and Health Survey (DHS) for 36 countries, [Braga et al. \(2018\)](#) found that increases in GDP were associated with women participating in their own health care, making major household purchases, and visiting family and friends.

¹An average growth of 2 percent compounded over 10 years (22 percent) was assumed. This effect was calculated as follows: $(0.134/100)*[(1+0.02)^{10}] = 0.03$, where 0.134 was the coefficient associated with the economic growth of the construction sector in a linear-log regression model. Also, 2 percent was taken as the benchmark because this was the average economic growth from 2006-2016. Finally, the same strategy was applied to calculate the effects of other sectors of economic activity.

Kabeer et al. (2013), using data from Bangladesh, Ghana, and Egypt, found that having a formal job and more education were correlated with women's empowerment.² Hanmer and Klugman (2016) found a positive link between economic growth and women's empowerment using data from the Demographic and Health Survey (DHS) for 58 countries.³ While these studies controlled for several well-known variables related to women's empowerment, their results could potentially be biased as a consequence of omitted variables and a potential problem of reverse causality. Another limitation of these studies is that they analyze the effect of economic growth at an aggregate level despite the fact that, as Moghadam (2003) mentions, there can exist a variety of patterns when considering economic growth by sector of activity.

The present paper makes three main contributions. First, to the best of the current author's knowledge, this is the first paper to analyze the effects of economic growth by sector on women's empowerment within the household. This is important because it enables an identification of the economic sectors that affect the empowerment of women. In addition, the results rule out the possibility that economic growth in some sectors has negative effects on the empowerment

²Empowerment was measured using questions related to spending decisions, being able to leave the home, participation in public life, and gender preferences regarding children.

³Empowerment was measured using questions regarding attitudes to intimate partner violence, control over resources, negotiation regarding having sex, negotiation of condom use, and being able to leave the home.

of women within the household. Second, while previous studies have found a correlation between economic growth and women's empowerment, these results were possibly affected by problems of omitted variables and reverse causality. These econometric challenges were overcome in the current study by applying a bounding methodology and an instrumental variable approach. Finally, the results show that less educated and indigenous women were the ones who benefited most from economic growth. In the case of indigenous women, it seems that economic growth helped them to overcome the barriers established by social norms. With regard to education level, the results of the current paper contrast with the findings of [Kabeer et al. \(2013\)](#) for Bangladesh, Ghana, and Egypt, where the greatest beneficiaries of growth were the most educated women.

The remainder of this paper is organized as follows. Section II describes the data and empirical methods used. Section III presents the results and Section IV concludes.

2 Data and Empirical Methods

2.1 Description of Data

To estimate the impact of socioeconomic development on women’s empowerment, data were drawn from the National Survey on Relationships within the Household ([ENDIREH \(2006\)](#), [ENDIREH \(2011\)](#), and [ENDIREH \(2016\)](#)), ENDIREH is a national- and state-level representative survey conducted in Mexico that collects data regarding domestic violence and women’s empowerment within the household for women aged 15 or older, and who are: (1) in a relationship (married or cohabiting), (2) previously married (divorced, separated, or widowed), and (3) single. For the purposes of the current paper, the sample was restricted to women living with their husbands (married or cohabiting), and aged between 15 and 60 years old. Thus, the final sample consisted of 184,153 of the women interviewed.

ENDIREH provides information for three categories of women’s empowerment: personal freedom (seven items), gender roles (three items), and participation in household decisions (four items).⁴ Responses to the questions regarding personal freedom adopt a value of one when a female respondent records not having to ask permission from her husband, and zero otherwise. Answers to the questions re-

⁴Table 2 presents each item by category. The selected questions appear in the three rounds of the survey studied here.

garding gender roles take a value of one when the respondent marks an affirmative response, and zero otherwise. Finally, responses to the questions regarding participation in household decisions adopt the value of one if the respondent records participating either jointly (with her partner) or independently, and zero otherwise. Using these items, an index based on principal components was developed. Following this, the value of the index was standardized to have a mean of zero and a standard deviation of one. Finally, the data on GDP per capita at the state level were taken from Mexico's National Institute of Statistics and Geography (INEGI) for the years 2006, 2011 and 2016. Table 1 and Figure 1 present information regarding GDP per capita at the state level. Here, a great variation can be observed between states growing at an average rate of 2.9% and states with zero or even negative growth in the period of study.

Table 2 compares the measures of women's empowerment with respect to GDP per capita. Here, "Treatment" refers to information regarding women's empowerment above the median GDP, and "Control" refers to data that fall below that median. Panel A presents the information regarding personal freedom. Women who were living in states that had a GDP higher than the median were found to have higher levels of personal freedom (0.04 SD), compared to those living in states with a GDP below this (-0.04 SD). Panel B presents the information re-

garding household decisions, where it can be observed that women participated more when GDP was above the median. Finally, Panel C presents the information regarding gender roles, indicating that women living in states with a GDP higher than the median tended to favor male gender roles to a lesser extent.

Panel D of Table 2 includes information for the controls that will be used, such as female characteristics, partner and household characteristics, and other state characteristics. Female characteristics here include age, education, speaking an indigenous language, the number of times the women have been married, and having experienced violence in the family of origin (blows, beaten, and insults). Partner and household characteristics include the partner's age, education, and speaking an indigenous language. Also, I include having children less than 20 years old, cohabitation, remittances, and cash transfers from PROGRESA. Finally, state characteristics include homicides per 100,000 inhabitants, unilateral divorce in the state, sex ratio (males to females), inequality (Gini coefficient), and living in a rural area.

2.2 Empirical Strategy

To estimate the effect of economic growth on women’s empowerment, a fixed effects strategy was employed at the state level. The robustness of these results was checked using the bounding methodology proposed by [Oster \(2017\)](#), and the instrumental variable strategy proposed by [Lewbel \(2012\)](#). The fixed effects regression is as follows:

$$Y_{ist} = \beta_0 + \beta_1 T_{st} + \beta_2 X_{ist} + \theta_s + \gamma_t + e_{ist} \quad (1)$$

where Y_{ist} is a variable measuring women’s empowerment for women i , in state s and year t ; T_{st} is the natural logarithm of per capita GDP; X_{ist} is a vector of controls; θ_s is a set of state-fixed effects, and γ_t is a set of year dummies. Standard errors are clustered at the state level to correct for autocorrelation of the outcome measure across years within a state. The coefficient of interest is β_1 , which represents the effects of GDP on women’s empowerment.

While state-fixed effects accounted for the unobserved time-invariant characteristics across the states, it is still possible that unobserved time-variant characteristics may have affected the results. To verify the robustness of the results, the bounding approach proposed by [Altonji et al. \(2005\)](#) and refined by [Oster \(2017\)](#) was employed.⁵ [Altonji et al. \(2005\)](#) observed that a common approach

⁵A number of recent empirical studies use Oster’s bounding methodology combined with fixed effects; see, for example, [Nghiem et al. \(2015\)](#), and [Walther \(2018\)](#).

to evaluating robustness to omitted variable bias has been to include additional control variables on the right-hand side of the regression. If such additions do not affect the coefficient of interest, then this coefficient can be considered unlikely to be biased. This strategy implicitly assumes that the selection on observables is informative about the selection on unobservables. Oster formalizes this idea, and provides conditions for bounds and identification. Namely, if the bounds exclude zero, then the results from the regression can be considered to be robust to omitted variable bias.⁶

⁶Following the notation in Oster, the full model takes the following form:

$$Y = \beta T + X_1 + X_2 + \epsilon.$$

where T is the variable of interest, X_1 contains the *observed* control variables multiplied by their coefficients, i.e., $X_1 = \sum_{j=1}^{J_o} X_j^o \gamma_j^o$, and X_2 contains all *unobserved* variables multiplied by their coefficients, i.e., $X_2 = \sum_{j=1}^{J_u} X_j^u \gamma_j^u$. Finally, ϵ is a random error representing the measurement error in Y , and is uncorrelated with X_1 , X_2 and T . Oster suggests the following approach to account for omitted variable bias:

(1) Regress Y on T , and report the parameter on T , denoted by β^0 , and the R-squared coefficient, denoted by R^0 .

(2) Regress Y on T and X_1 , and report the parameter on T , denoted by $\tilde{\beta}$, and the R-squared coefficient, denoted by \tilde{R} .

(3) Define R_{max} as the overall R-squared of the model, that is, the R-squared that would be obtained from a regression of Y on both observables (T , X_1) and unobservables (X_2).

(4) Define δ to be a parameter that ensures equality $\frac{Cov(T, X_2)}{Var(X_2)} = \delta \frac{Cov(T, X_1)}{Var(X_1)}$. In other words, this relationship formalizes the idea of [Altonji et al. \(2005\)](#) that the magnitude and sign of the relationship between T and X_1 provides some information about the magnitude and sign of the relationship between T and X_2 . For example, if $-1 \leq \delta \leq 1$, then the variable of interest (T) is no more correlated with the unobservables (X_2) than it is correlated with the observables (X_1). The case $0 \leq \delta \leq 1$ has a similar interpretation, with the additional assumption that the relationship between T and X_1 has the same sign as the relationship between T and X_2 .

Oster shows that $\beta^* \approx \tilde{\beta} - \delta \frac{(\beta^0 - \tilde{\beta})(R_{max} - \tilde{R})}{(\tilde{R} - R^0)}$ is a consistent estimator of the effect of T on Y , β . It should be noted that this is a close approximation to the consistent estimator and is used

Another problem with specification (1) is a potential reverse causality. For example, it could be the case that women’s personal freedom impacts economic growth. A widely used alternative for identifying causal relationships is the use of instrumental variables. However, finding an appropriate instrument is often difficult in practice. Another way of dealing with this endogeneity problem has been proposed by [Lewbel \(2012\)](#), who suggests the inclusion of an instrumental variable generated through heteroscedasticity. In particular, he proposes the exploitation of the correlation between the exogenous variables and heteroscedasticity of the model disturbances in order to achieve identification without imposing any exclusion restrictions.⁷ Following Lewbel, the reverse causality effect can be modeled as follows:

to present the intuition regarding the methodology. The complete approximation is presented in [Oster \(2017\)](#).

In order to estimate β^* , estimates of δ and R_{max} are required. Oster proposes assumptions for δ and R_{max} that allows one to determine whether β^* is different to zero. Oster proposes that $R_{max} = \min\{1.3\tilde{R}, 1\}$, where \tilde{R} is as defined above. The cut-off value of 1.3 is derived from a sample of papers containing randomized controlled trials and nonrandomized data, and published in the *American Economic Review*, *Quarterly Journal of Economics*, *The Journal of Political Economy*, and *Econometrica* from 2008-2010. She determined that using this cut-off allowed 90% of the randomized and 50% of the nonrandomized results to continue being statistically significant. After determining the value of R_{max} , Oster suggests that β^* be calculated for all the following ranges of δ : $0 \leq \delta \leq 1$ (the current paper also presents the results for δ : $-1 \leq \delta \leq 0$), enabling the construction of the set: $[\tilde{\beta}, \beta^*]$. If this set excludes zero, the results from the controlled regressions can be considered to be robust to omitted variable bias. In other words, the results indicate that $\beta^* \neq 0$.

⁷A number of recent empirical studies use the Lewbel method as an alternative to the standard instrumental variable approach; see, for example, [Emran and Hou \(2013\)](#), [Chowdhury et al. \(2014\)](#), and [Deuffhard et al. \(2018\)](#).

$$T_{st} = \gamma_1 Y_{ist} + \gamma_2 X_{ist} + \gamma_s + \gamma_t + \xi_{ist} \quad (2)$$

Where the variable T_{st} represents the potential endogenous variable (GDP). Y_{ist} and X_{ist} are as defined in equation (1) and ξ_{ist} is the error term. The heteroscedasticity-based identification strategy assumes the existence of heteroscedasticity in ξ_{ist} (and, consequently, on T_{st}). In particular, it is assumed that: $cov(X_{ist}, \xi_{ist}^2) \neq 0$. Lewbel suggests using $[X_{ist} - E(X_{ist})]\hat{\xi}_{ist}$ as an instrument for T_{st} in estimating (1), where $\hat{\xi}_{ist}$ denotes the predicted residuals obtained by estimating equation (2), excluding Y_{ist} on the right-hand side. Finally, Lewbel points out that the condition $cov(X_{ist}, \xi_{ist}^2) \neq 0$ need only apply for a subset, Z_{ist} , of the vector X_{ist} . More detailed explanations can be found in [Lewbel \(2012\)](#).

3 Results

3.1 Effects of GDP on Women's Empowerment

The fixed effects results of aggregate economic growth (GDP) on women's personal freedom are presented in Table 3, controlling for female characteristics, partner and household characteristics, and state characteristics.⁸ Columns 1 to 7

⁸Female characteristics include age, education, speaking an indigenous language, and violence within family of origin. Partner and household characteristics include partner's age, education, and speaking an indigenous language. Respondents' having children under 20 years old and

present the linear regression results for each question measuring personal freedom. It can be seen that almost all of the items here were found to be statistically significant and positive: work (0.043), shopping (.047), visiting relatives (0.043), buying something for oneself (0.062), making friends (0.052), and freedom of vote (0.123). The only item that did not emerge as statistically significant was that of freedom of policy participation. Column 8 presents the effect of economic growth on the index regarding personal freedom using principal component analysis. A positive effect of GDP per capita on personal freedom can be observed (0.203). To put the size of this effect in perspective, a woman living in a state experiencing a 2 percent annual rate of increase in GDP compounded over 10 years (22 percent) is here predicted to experience an increase of 0.04 standard deviations in her personal freedom.⁹

Table 4 presents the results for the effects of socioeconomic variables on the perception of gender roles that favor men. As in the previous case, Columns 1 to 3 present the results for each question item, and Column 4 shows the index regarding gender roles using principal component analysis. A positive effect of economic growth emerged on the following variables: “a man must take responsibility for cohabitation status are also included. State characteristics include homicides per 100,000 inhabitants, unilateral divorce in the state, sex ratio (males to females), inequality (Gini coefficient), and living in a rural area.

⁹The effect was calculated as follows: $(0.203/100) * [(1 + 0.02)^{10}] = 0.04$. The 2 percent was used as a reference point because it represented the average economic growth from 2006-2016.

all of the family's expenses", and "it is the wife's obligation to have sex with her husband even if she does not want to". Yet, these effects were not statistically significant. In addition, economic growth was found to have a negative effect on the item, "a woman does not have the same capacity as a man to earn money" (-0.033), which coefficient was statistically significant. Finally, a positive effect of economic growth could be observed in the index of gender roles perception, although this was not statistically significant.

Table 5 presents the results for women's household decision-making. Columns 1 to 4 present the results for each question item, and Column 5 shows the index regarding household decisions. Economic growth was here found to have a positive effect on the following variables, although this was not statistically significant: (1) "using the money you earn" (Column 1), (2) "permits for daughters and sons" (Column 3), and (3) "having sex" (Column 4). A positive and statistically significant effect was found on "deciding how money is spent" (Column 2). However, there was no statistically significant effect of economic growth on the index regarding household decisions (Column 5).

Fixed effects control for time-invariant omitted variables, but this technique does not eliminate time-variant omitted variables. Thus, the range of estimated

parameters was approximated using a bounding methodology proposed by [Oster \(2017\)](#). The effects of GDP were checked on: (1) personal freedom, (2) gender roles that favor males, and (3) women’s participation in household decisions. [Table 6](#) presents the results of the bounding methodology. As can be seen, only the bounds for personal freedom do not include zero, suggesting that this result was robust to the problem of omitted variable bias.

Although the results appear to be robust to the problem of omitted variables, there may have been a problem of reverse causality. That is, personal freedom may have impacted economic growth, and not the other way around. To overcome this situation, a strategy of instrumental variables was applied. [Table 7](#) presents the results of using an instrumental variable constructed through heteroscedasticity, following [Lewbel \(2012\)](#). Using this strategy, the results that were observed using the fixed effects and bounding methodology were maintained. Nevertheless, a small decrease could be observed in the effect of GDP on personal freedom.¹⁰

A limitation of this analysis is that it does not enable individual knowledge of the particular sectors of economic activity that are improving women’s personal freedom. For example, [Kabeer et al. \(2013\)](#) suggests that the sector of economic ac-

¹⁰The first-stage regression in equation (2) was estimated by excluding Y_{ist} , and heteroscedasticity was tested for using a Breush-Pagan test. According to this test, (GDP, $\chi^2 = 546$, p-value=0.00), there was strong evidence for heteroscedasticity.

tivity that contributed to women's empowerment in Egypt was the creation of jobs by the public sector. In the case of Bangladesh, they suggest that jobs generated by non-governmental organizations (NGOs) contributed to such empowerment.

In addition, there may be some sectors that contribute positively, and others negatively, to women's empowerment, but, when using the aggregate measure of GDP, they cancel each other out. In addition, the possibility of economic growth exerting negative effects on women's empowerment has been raised ([Moghadam, 2003](#)). For example, [Kabeer et al. \(2013\)](#) mentions that in the case of Ghana, women were largely excluded from certain production activities with high rates of economic growth, such as mineral extraction.

The following section analyzes the effects of GDP by sector of economic activity in order to: (1) identify the sectors of economic activity that are contributing to women's personal freedom; and (2) identify the sectors of economic activity that contribute positively or negatively to women's empowerment.

3.2 Effects of GDP by Sector of Economic Activity on Women's Empowerment

Table 8 presents the results of GDP by economic activity on the three indexes regarding women's empowerment: personal freedom, perception of gender roles, and household decision making. The GDP by economic activity data were prepared by the National Institute of Statistics and Geography (INEGI) in Mexico. These data contain two levels of disaggregation and aim to maintain comparability with the North American Industry Classification System (NAICS). The sectors analyzed are: agriculture, mining, electricity, construction, manufacturing, wholesale trade, retail trade, transportation, mass media, financial services, real estate services, professional services, corporate services, business support, education, health, cultural services, temporary accommodation, and government.

The results show that there was no effect of agricultural activity on any of the indicators of women's empowerment. In the case of women's personal freedom, the activity sector that contributed most to this indicator was construction (0.134). In particular, a woman living in a state experiencing a 2 percent annual rate of increase in the construction sector, compounded over 10 years (22 percent), was found to have an increase in her personal freedom of 0.03 standard deviations. More interesting still, it was observed that growth in the health and cultural ser-

vices sectors diminished the perception of roles favoring men by 0.202 and 0.277 standard deviations, respectively. Finally, in the case of the household decisions index, growth in the transport sector (0.200) and cultural services (0.333) was found to have a positive effect on this.

It is possible that the effects found by sector of activity were affected by the problem of omitted variables. Table 9 presents the results for the variables that were statistically significant and checks their robustness using the bounding methodology proposed by Oster (2017). The following bounds emerged: (1) effect of construction sector on personal freedom: [0.0605, 13.971], (2) effect of health services on gender roles: [-0.262, 246.056], (3) effect of cultural services on gender roles: [-315.186, -0.113]; (4) effect of cultural services on household decisions: [0.059, 46.957]; and (5) effect of transportation industry on household decisions: [0.095, 21.421]. These results show that all of the effects were robust to the problem of omitted variables, with the sole exception of the growth of the health sector on the perception of gender roles.

Another econometric problem is that of these results presenting a potential reverse causality. Table 10 presents the results using the instrumental variable approach proposed by Lewbel for the relationships found to be robust to the prob-

lem of omitted variables. First, a check was undertaken that the condition of heteroscedasticity (equation 2 of the empirical strategy), which is necessary for the implementation of the instrumental variable strategy proposed by Lewbel (2012), was satisfied. A Breush-Pagan test was run to check for heteroscedasticity. All of the variables of interest passed this test (Construction, $\chi^2 = 54,115$, p-value = 0.00; Cultural services, $\chi^2 = 3,102$, p-value = 0.00; and Transportation, $\chi^2 = 8,900$, p-value = 0.00). Finally, it was found that using this instrumental variable strategy, all of the results observed using fixed effects and a bounding methodology were maintained.¹¹

Another aspect worthy of analysis was the possibility of being heterogeneous effects on women's empowerment. For example, [Kabeer et al. \(2013\)](#) suggest that in the case of Bangladesh, Ghana and Egypt, educated women were the ones who benefitted most from economic growth. Apart from women of different education levels, another important group in the context of Mexico is that of indigenous women. It is possible that indigenous women, due to social norms, do not obtain benefits from economic growth. Finally, another group of interest was that of women with children. It is possible that women who have many children are less likely to obtain benefits from greater economic growth.

¹¹It should be noted that the value of the F statistic for the first stage differs across the regressions. This is because the instruments were generated using $[X_{ist} - E(X_{ist})]\hat{\xi}_{ist}$, where $\hat{\xi}_{ist}$ were the predicted residuals obtained by estimating equation (2), excluding Y_{ist} on the right-hand side.

Table 11 presents the heterogeneous effects regarding women's education (1 if they completed secondary education or above and zero otherwise); indigenous women (1 if they speak an indigenous language and 0 otherwise); and number of children (1 if they have two or more children and zero otherwise). In the case of education, it was found that women with a lower level of education obtained more benefits from: (1) the economic growth in culture services, in terms of the perception of gender roles; (2) the economic growth of cultural services in terms of household decisions; and (3) the economic growth of transportation services in terms of household decisions. Regarding indigenous women, the findings indicate that they received benefits from: (1) the effects of the economic growth of the construction sector on personal freedom; (2) the effects of the economic growth of cultural services on the perception of gender roles and household decisions; and (3) the effects of the economic growth of the transport sector on household decisions. No evidence was found of heterogeneous effects regarding the number of children.

Finally, the possible mechanisms by which economic growth affects women's empowerment were analyzed. A first mechanism is that economic growth may have improved women's access to the labor market, their income, and greater bargaining power within the household. To measure this mechanism, a dummy variable

was generated to assess whether women had been in work or not in the week prior to the survey. Another possible mechanism is that economic growth brought an improvement in household income and allowed the acquisition of assets related to better communication. To measure this mechanism, a dummy variable was used that accounted for the possession of a landline in the home. Finally, another possible mechanism is that economic growth allowed households to access assets that allowed women to produce, and to use their time more effectively. To measure this mechanism, a dummy variable was generated to measure the possession of a washing machine inside the home.

Table 12 presents the results related to the effects of economic growth on women's empowerment through access to work, the possession of a landline, and having a washing machine. If these are, indeed, the mechanisms by which economic growth affects women's empowerment, it would be expected that once these mechanisms are included in the regressions, the effect of economic growth would disappear. Based on the cases analyzed, there was only evidence that access to the labor market was the mechanism by which economic growth in the construction sector affected women's personal freedom. This result is interesting, because only 10 percent of women work occurs in the construction sector. One possible explanation for this may be the fact that, being a sector dominated by men, once

women access this sector, it improves their bargaining power with men and their personal freedom.

In the case of the cultural services sector, this includes artistic and cultural events, sports shows, and access to museums, among others. It is possible that the growth of this sector, by itself, promotes an agenda that decreases the perception of gender roles dominated by men and promotes the notion that women should make greater decisions within the household.

Finally, in the case of the transport sector, it allows women to improve their working and non-working conditions. For example, [Duchene \(2011\)](#) suggests that safer transportation promotes the engagement of women in more non-work-related travel, such as running household errands and being more likely to travel with children. These factors can contribute to women making greater decisions within the household.

3.3 Discussion of Results

The results presented here show that not all sectors of economic activity contribute to the empowerment of women within the household. Yet, the identification

of strategic sectors, such as cultural services, can be fundamental to the generation of public policies that have this empowerment as their objective.

The current study found less educated and indigenous women to be the main beneficiaries of economic growth. While this result seems counterintuitive, it may be explained by the dynamics of economic growth that contribute to women's empowerment in Mexico. For example, [Kabeer et al. \(2013\)](#) suggest that in Egypt, the increase in this empowerment was a consequence of an expansion in the public sector that demanded the work of educated women. In the case of Mexico, the current study provides some evidence to suggest that the cultural services sector contributes to women's empowerment. Thus, cultural services allowed not only the most educated women to benefit from economic growth, but also the least educated and indigenous women.

4 Conclusion

There exists persuasive evidence that gender equality in education and employment contribute to economic growth. However, there is not enough evidence that economic growth can, on its own, improve gender equality (Kabeer, 2016). In addition, few papers have analyzed the effect of economic growth on the empowerment of women within the household. Furthermore, the papers that have analyzed this relationship (Braga et al. 2018; Hanmer and Klugman 2016) present econometric challenges due to omitted variables and reverse causality. Finally, little is known about the sectors of economic activity that contribute to women's empowerment within the household.

This paper analyzes the effects of economic growth on women's empowerment within the household in Mexico. Using a fixed effects model at the state level and three rounds of a national-state representative survey focusing on women's empowerment, the current study found that: (1) economic growth in the construction sector improved women's personal freedom; (2) economic growth in the cultural services improved women's participation in household decisions and reduced the perception of gender roles that favor men; (3) economic growth in the transport sector increased women's participation in household decisions; and (4) there was evidence of heterogeneous effects, whereby less educated women and

indigenous women were the main beneficiaries of economic growth. These results were found to be robust to a potential problem of omitted variables using a bounding methodology ([Oster, 2017](#)), and to the problem of reverse causality by applying an instrumental variable approach ([Lewbel, 2012](#)).

In terms of public policy, this paper offers information on two sectors that can contribute to women's empowerment within the household: transportation and cultural services. Cultural services can be a mechanism for distributing information that facilitates women's empowerment through the removal of the perceptions of gender roles that favor men. In the case of the transport sector, governments could promote an agenda that increases accessibility and allows women to transport themselves in a safe way. These measures would allow for the removal of barriers that limit women's access to the labor market and, ultimately, contribute to their empowerment.

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5 Appendix

Figure 1: Per Capita Economic Growth 2006-2016

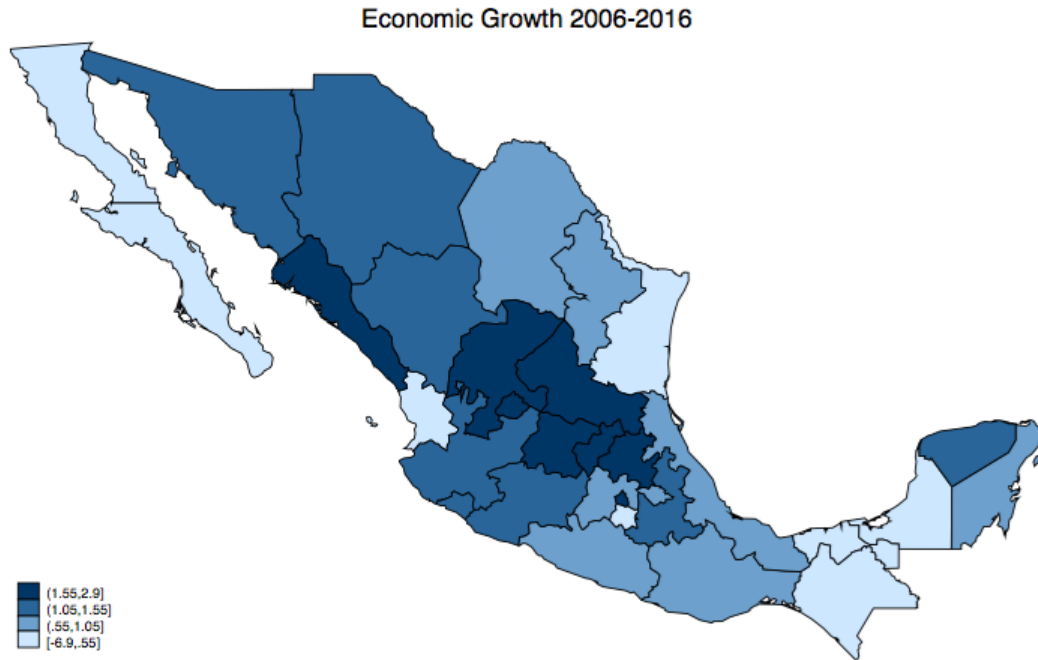


Table 1: Per Capita Economic Growth (2006-2016)

	Log GDP 2006 (a)	Log GDP 2016 (b)	Growth (c)
Aguascalientes	11.7	12.0	2.9
Guanajuato	11.4	11.7	2.8
Zacatecas	11.3	11.5	2.5
Distrito Federal	12.5	12.7	2.4
Querétaro	11.9	12.2	2.3
San Luis Potosí	11.5	11.7	1.9
Hidalgo	11.3	11.4	1.6
Sinaloa	11.6	11.7	1.6
Michoacán	11.2	11.4	1.5
Colima	11.7	11.8	1.4
Jalisco	11.7	11.9	1.3
Chihuahua	11.7	11.9	1.3
Yucatán	11.5	11.6	1.3
Sonora	12.0	12.2	1.3
Durango	11.5	11.6	1.2
Puebla	11.3	11.4	1.1
Nuevo León	12.3	12.4	1.0
Guerrero	11.0	11.1	1.0
Oaxaca	11.0	11.1	0.9
Quintana Roo	11.9	12.0	0.9
Veracruz	11.4	11.5	0.9
México	11.3	11.4	0.8
Tlaxcala	11.2	11.2	0.7
Coahuila	12.1	12.2	0.6
Nayarit	11.4	11.5	0.5
Tabasco	12.2	12.3	0.5
Baja California Sur	12.0	12.0	0.2
Chiapas	10.9	10.9	0.1
Morelos	11.5	11.5	0.0
Baja California	11.9	11.9	-0.3
Tamaulipas	11.9	11.8	-0.5
Campeche	14.1	13.4	-6.9

Note: The data on GDP is taken from the National Institute of Statistics and Geography. The data regarding population is taken from the National Council of Population.

Table 2: Descriptive Statistics

	GDP Per Capita	
	Treatment	Control
Panel A. Personal freedom		
<i>Personal freedom index (standardized)</i>	0.04	-0.04
Work for a payment or compensation	0.22	0.20
Go shopping	0.30	0.29
Visit relatives or friends	0.24	0.22
Buy something for you	0.56	0.54
Participate in any activity or policy	0.38	0.33
Make friends with a person that your partner does not know	0.67	0.64
Vote for a party or candidate	0.81	0.77
Panel B. Household decisions		
<i>Household decisions index (standardized)</i>	0.04	-0.04
What to do with the money you earn or that you have	0.95	0.94
How the money is spent	0.93	0.92
On permits for daughters and sons	0.92	0.90
When having sex	0.93	0.92
Panel C. Gender roles		
<i>Gender roles index (standardized)</i>	-0.09	0.09
The man must take responsibility for all the expenses of the family.	0.51	0.58
A woman does not have the same capacity as a man to earn money.	0.12	0.17
It is the wife's obligation to have sex with her husband	0.09	0.11
Panel D. Control Variables		
Woman's age	38.98	39.02
Woman's Education:	0.69	0.60
1 Secondary or more 0 Primary or no schooling		
Indigenous Woman	0.04	0.10
Partner's age	42.36	42.55
Partner's Education:	0.70	0.61
1 Secondary or more 0 Primary or no schooling		
Indigenous Partner	0.05	0.10
Children less 20 years old:	0.51	0.55
1 Two or more 0 Otherwise		
Cohabiting couple	0.24	0.245
Number of times married	1.12	1.09
Remittances	0.03	0.04
Cash Transfers (PROSPERA)	0.11	0.20
Homicides per 100,000 inhabitants	18.43	18.46
Sex ratio (males to females)	100.95	105.51
Inequality (Gini coefficient)	0.47	0.48
Unilateral Divorce: 1 Yes 0 No	0.13	0.11
Rural: 1 Yes 0 No	0.18	0.24
Blows in your family of origin	0.27	0.30
You were beaten in your family of origin	0.36	0.39
Insults in your family of origin	0.28	0.31

Source: National Survey on Relationships within the Household (ENDIREH)

Table 3: FE Estimates: Effects of Economic Growth on Women’s Empowerment (Personal Freedom)

	Work (1)	Shopping (2)	Visit Relatives (3)	Buy things for you (4)	Policy participation (5)	Make friends (6)	Freedom of vote (7)	Personal freedom (8)
Log (GDP Per Capita)	0.043* (0.022)	0.047** (0.021)	0.043** (0.020)	0.062** (0.023)	0.034 (0.021)	0.052** (0.022)	0.123*** (0.034)	0.203*** (0.073)
Female characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.03	0.03	0.02	0.04	0.03	0.08	0.05	0.07
Observations	161638	179766	179462	177835	154647	170568	171981	132181

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner’s age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: FE Estimates: Effects of Economic Growth on Women’s Empowerment (Gender Roles)

	(1)	(2)	(3)	(4)
Log (GDP Per Capita)	0.062 (0.047)	-0.033*** (0.011)	0.005 (0.019)	0.022 (0.076)
Female characteristics	Yes	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes	Yes
R^2	0.15	0.11	0.08	0.20
Observations	181832	181796	181672	181481

Note: column (1) refers to “man must take responsibility for all the expenses of the family”; column (2) refers to “a woman does not have the same capacity as a man to earn money”; (3) refers to “it is the wife’s obligation to have sex with her husband even if she does not want”; and (4) refers to an index using principal components. Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner’s age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: FE Estimates: Effects of Economic Growth on Women’s Empowerment (Household Decisions)

	(1)	(2)	(3)	(4)	(5)
Log (GDP Per Capita)	0.005 (0.011)	0.020*** (0.005)	0.013 (0.010)	0.013 (0.010)	0.050 (0.031)
Female characteristics	Yes	Yes	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.03	0.02	0.03	0.05	0.05
Observations	174237	181760	153446	176598	144353

Note: column (1) refers to “use the money you earn”; column (2) refers to “how the money is spent”; (3) refers to “permits for daughters and sons”; (4) refers to “having sex” and (5) refers to an index using principal components. Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner’s age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Bounding Methodology: Effects of Economic Growth on Women’s Empowerment

	Personal freedom (a)	Male gender roles (b)	Household decisions (c)
	$0 \leq \delta \leq 1$		
Log (GDP Per Capita)	[0.203, 40.037]	[0.022, 8.617]	[-286.087, 0.050]
	$-1 \leq \delta \leq 0$		
Log (GDP Per Capita)	[0.101, 0.203]	[-0.115, 0.022]	[0.050, 0.059]
Female characteristics	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes
Observations	132181	181481	144353

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner’s age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural.

Table 7: Lewbel’s Instrumental Variables: Effects of Economic Growth on Women’s Empowerment

	Personal freedom (a)	Male gender roles (b)	Household decisions (c)
Log (GDP Per Capita)	0.179*** (0.063)	0.031 (0.082)	0.035 (0.031)
Female characteristics	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes
R^2	0.07	0.20	0.05
Observations	132181	181481	144353
F-statistic first stage	113	814	409

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner’s age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Effects of Economic Growth on Women's Empowerment (Agricultural, Industry, and Service Sectors)

	Personal freedom (a)	Male gender roles (b)	Household decisions (c)
<i>Agriculture</i>			
Agriculture	0.057 (0.087)	-0.018 (0.066)	-0.058 (0.049)
<i>Industry</i>			
Mining	0.005 (0.023)	-0.004 (0.014)	-0.006 (0.011)
Electricity and water supply	-0.020 (0.059)	0.040 (0.065)	-0.031 (0.033)
Construction	0.134** (0.064)	0.046 (0.043)	0.040 (0.030)
Manufacturing industry	0.171 (0.105)	0.059 (0.042)	-0.030 (0.046)
<i>Services</i>			
Wholesale trade	0.008 (0.108)	0.006 (0.052)	-0.027 (0.042)
Retail trade	0.116 (0.188)	0.102 (0.093)	-0.118 (0.082)
Transport, mail, and storage	0.012 (0.088)	-0.031 (0.061)	0.200*** (0.053)
Mass media	0.054 (0.093)	-0.004 (0.047)	-0.001 (0.048)
Financial and insurance services	0.011 (0.125)	-0.029 (0.075)	0.040 (0.075)
Real estate services	0.056 (0.594)	-0.179 (0.465)	0.499 (0.360)
Professional services	0.318* (0.181)	0.165 (0.101)	-0.074 (0.088)
Corporate	0.050 (0.205)	0.142 (0.131)	0.108 (0.103)
Business support services	0.177 (0.126)	-0.069 (0.052)	0.000 (0.064)
Educational services	-0.186 (0.210)	-0.240* (0.136)	0.027 (0.147)
Health and social assistance services	0.117 (0.131)	-0.202** (0.098)	0.057 (0.078)
Cultural and sports recreation services	-0.017 (0.182)	-0.277*** (0.080)	0.333*** (0.102)
Temporary accommodation services	0.066 (0.077)	0.027 (0.043)	0.014 (0.050)
Government and international agency services	0.168 (0.182)	-0.022 (0.122)	0.053 (0.088)
Female characteristics	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes
Observations	132181	181481	144353

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner's age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Bounding Methodology: Effects of Economic Growth on Women’s Empowerment

	Personal freedom	Male gender roles	Household decisions
	(a)	(b)	(c)
		$-1 \leq \delta \leq 1$	
Construction	[0.0605, 13.971]		
Health and social assistance services	[-0.262, 246.056]		
Cultural and sports recreation services	[-315.186, -0.113] [0.059, 46.957]		
Transport, mail, and storage	[0.095, 21.421]		
Female characteristics	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes
Observations	132181	181481	144353

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner’s age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural.

Table 10: Lewbel's Instrumental Variables: Effects of Economic Growth on Women's Empowerment

	Personal freedom (a)	Male gender roles (b)	Household decisions (c)	Household decisions (d)
Construction	0.123* (0.068)			
Cultural and sports recreation services		-0.312*** (0.077)	0.349*** (0.098)	
Transport, mail and storage				0.202*** (0.053)
Female characteristics	Yes	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes	Yes
R^2	0.07	0.20	0.05	0.05
Observations	132181	181481	144353	144353
F-statistic first stage	41.3	41.7	64.5	983.7

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner's age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Heterogeneous Effects of Economic Growth on Women’s Empowerment with respect to Education, Indigenous, and Number of Children

	(a)	(b)	(c)
Dep. variable: Personal freedom			
Construction	0.139** (0.064)	0.130* (0.065)	0.128* (0.065)
Construction × Woman’s Education: 1 Secondary or more 0 Primary or no schooling	-0.009 (0.014)		
Construction × Indigenous Woman		0.043* (0.024)	
Construction × Children less 20 years old: 1 Two or more 0 Otherwise			0.009 (0.011)
Dep. variable: Male gender roles			
Cultural and sports recreation services	-0.325*** (0.085)	-0.274*** (0.081)	-0.281*** (0.080)
Cultural and sports recreation services × Woman’s Education: 1 Secondary or more 0 Primary or no schooling	0.055** (0.021)		
Cultural and sports recreation services × Indigenous Woman		-0.041*** (0.013)	
Cultural and sports recreation services × Children less 20 years old: 1 Two or more 0 Otherwise			0.006 (0.007)
Dep. variable: Household decisions			
Cultural and sports recreation services	0.359*** (0.102)	0.324*** (0.103)	0.326*** (0.105)
Cultural and sports recreation services × Woman’s Education: 1 Secondary or more 0 Primary or no schooling	-0.030*** (0.011)		
Cultural and sports recreation services × Indigenous Woman		0.126** (0.055)	
Cultural and sports recreation services × Children less 20 years old: 1 Two or more 0 Otherwise			0.012 (0.008)
Dep. variable: Household decisions			
Transport, mail, and storage	0.245*** (0.053)	0.178*** (0.051)	0.192*** (0.053)
Transport, mail, and storage × Woman’s Education: 1 Secondary or more 0 Primary or no schooling	-0.068*** (0.018)		
Transport, mail, and storage × Indigenous Woman		0.238** (0.101)	
Transport, mail, and storage × Children less 20 years old: 1 Two or more 0 Otherwise			0.013 (0.017)
Female characteristics	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner’s age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Mechanisms

	(a)	(b)	(c)
Dep. variable: Personal freedom			
Construction	0.128* (0.064)	0.136** (0.065)	0.135** (0.065)
Working: 1 Yes 0 No	0.181*** (0.008)		
Landline		0.082*** (0.009)	
Washing machine			0.110*** (0.007)
Dep. variable: Male gender roles			
Cultural and sports recreation services	-0.269*** (0.078)	-0.253*** (0.081)	-0.271*** (0.079)
Working: 1 Yes 0 No	-0.189*** (0.006)		
Landline		-0.130*** (0.007)	
Washing machine			-0.149*** (0.007)
Dep. variable: Household decisions			
Cultural and sports recreation services	0.324*** (0.104)	0.322*** (0.102)	0.330*** (0.103)
Working: 1 Yes 0 No	0.125*** (0.006)		
Landline		0.051*** (0.007)	
Washing machine			0.074*** (0.010)
Dep. variable: Household decisions			
Transport, mail, and storage	0.199*** (0.055)	0.199*** (0.052)	0.200*** (0.052)
Working: 1 Yes 0 No	0.125*** (0.006)		
Landline		0.052*** (0.007)	
Washing machine			0.074*** (0.010)
Female characteristics	Yes	Yes	Yes
Partner/household	Yes	Yes	Yes
State characteristics	Yes	Yes	Yes
State/Year FE	Yes	Yes	Yes

Note: Female characteristics include age, education, speak an indigenous language, number of times married, blows, beaten, and insults in her family of origin. Partner and household characteristics include partner's age, education, and speaking an indigenous language. In addition, children less than 20 years old, number of times married, cohabiting, remittances, and cash transfers from PROSPERA. State characteristics include homicides per 100,000 inhabitants, sex ratio (males to females), inequality (Gini coefficient), unilateral divorce, and rural. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$