Effect of Household Assets on Labour Force Participation Rate of Working Age Married Women

Jisna James

Indian Statistical Institute, Delhi

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Abstract

This report presents an empirical analysis of effect of household assets on labour force participation rate of married working age(25-49) women in India.We employ ordinary least squares (OLS) regression with village fixed effects to account for unobserved characteristics at the village level. Additionally, we control for a range of individual and household characteristics, including education level, husband's employment status, age, religion, and caste. Our analysis reveals a strong negative association between household asset level and the likelihood of women participating in the labor force, when we control for everything else.

1 Introduction

The interplay between household asset levels and women's labor force participation rates (LFPR) is a complex and multifaceted issue, particularly within the socio-economic context of India. Despite the capability and potential of many women to engage in the labor market, social stigmas surrounding women working outside the home often deter them from seeking employment. This phenomenon is observed across all social strata; however, the necessity for additional household income in poorer sections might drive higher labor force participation among women in these groups.

Previous research has provided insights into this dynamic. Klasen and Pieters [2] found that economic growth and rising household incomes in urban India led to a decrease in female labor force participation due to the income effect, whereby increased family income reduces the necessity for women to work . Similarly, Afridi, Dinkelman, and Mahajan [1] demonstrated that improved household wealth and amenities significantly lower female labor supply by increasing the opportunity cost of women's time spent in the labor market .

In this study, we focus on working-age women, specifically those between the ages of 25 and 49, to exclude younger women who might still be pursuing education. Using data from the 2019 National Family Health Survey (NFHS)-5 of India, we aim to analyze the impact of household asset levels on the likelihood of women entering the labor force. In particular, we attempt to answer the following question.

What is the impact of belonging to a richer household on the likelihood of married working age women participating in the labor force? We utilize data from the National Family Health Survey (NFHS) 5 of India - 2019, focusing on Women between the ages of 25 and 49 who are currently married.

2 Data & variables

2.1 Data

For our study we use NFHS 5(2019) data. We use data from the women's questionnaire, which collected information on women aged 15-49 on various topics. Our population is working age married women.We use data of married women of age 25-49 to conduct analyses.

A household questionnaire is used to collect information on characteristics of the household's. It is also used to identify members of the household who are eligible for an individual interview. Eligible respondents are then interviewed using an individual questionnaire. After deleting observations with missing data on any variable mentioned below, the final sample consists of 61,261 observations.

2.2 Outcome Variable : *LFPR*

Outcome variable of this study is labour force participation rate. The labor force participation rate (LFPR) is determined by asking respondents whether they have worked in the past 12 months. A respondent is considered to have worked in the last 12 months if they are either currently working or if they are working but currently on leave for no more than 7 days. This approach ensures that individuals who have had recent employment, even if temporarily on leave, are considered to be working.

$$LFPR = \begin{cases} 1 & \text{if respondent has worked in last 12 months} \\ 0 & \text{otherwise} \end{cases}$$

2.3 Asset Level : *Rich*

Asset level is the main independent variable of our study. It is measured by the wealth index, which reflects the relative wealth of households where women reside. The wealth index is derived from various indicators, such as ownership of assets like televisions and bicycles, materials used for housing construction, and types of

water access and sanitation facilities. National wealth quintiles are constructed by assigning a score to each household member, ranking individuals by their scores, and then dividing the population into five equal categories, each representing 20 percent of the population.

An important characteristic of these assets is their relation with readily available income of family. While assets such as land or houses may signify a higher asset level, because of their illiquid nature it might not significantly impact the labor force participation rate of women. We further categorize asset levels into two categories: bottom two quintile as 'Poor' and top 3 quintile as 'Rich'.This classification allows us to examine how different levels of asset ownership affect labour force participation. We will include dummy Rich in regression to analyse impact of asset ownership on labour force participation with poor as reference category

$$\text{Rich} = \begin{cases} 1 & \text{if respondent belongs to quintile 3, 4, or 5} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Poor} = \begin{cases} 1 & \text{if respondent belongs to quintile 1 or 2} \\ 0 & \text{otherwise} \end{cases}$$

2.4 Age

The age of respondents may influence their asset levels, as individuals in middle age typically have higher earning potential and asset accumulation. As age increases, women tend to be free from childbirth and child-caring duties, making them more likely to join the labor force.

Our study focuses on working-age women, as they represent a population with significant potential for labor force participation. By limiting the analysis to working-age women above 25 years old, we address data limitations caused by higher rates of missing data of labour force participation among younger individuals, who may still

be in school.

2.5 Husband employed

Husband's employment can positively impact the asset level of the household. As there is an income stream already in the household, husband's employment may decrease the chances of women going to work. Another effect is that an unemployed husband is highly likely to not send his wife to work than employed husband because of the stigma around women working when the man is sitting at home.

Husband employment is determined by asking respondents whether they have worked in the past 12 months. A respondent is considered to have worked in the last 12 months if they are either currently working or if they are working but currently on leave for no more than 7 days.

$$\text{Husband Employed} = \begin{cases} 1 & \text{if respondent has worked in last 12 months} \\ 0 & \text{otherwise} \end{cases}$$

2.6 Religion

Different religions have different beliefs and practices. Some religions restrict women from participating in the labor force. Additionally, people in some religions tend to be wealthier than those in other religions, which contributes to the effect of religion on asset levels.

We categorise religion in 4 categories: Hindu, Muslim, Christian and Others. All religion except Christian, Hindu and Muslim are included in the others category,it constitutes around 5 percentage of sample. We will introduce three dummies(Hindu, Muslim and Christian) in regression to capture effect of religion on labour force participation rate with others as reference category.

$$\text{Christian} = \begin{cases} 1 & \text{if respondent is a Christian} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Hindu} = \begin{cases} 1 & \text{if the respondent is a Hindu} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Muslim} = \begin{cases} 1 & \text{if the respondent is a Muslim} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Others} = \begin{cases} 1 & \text{if the respondent belongs} \\ & \text{to other category} \\ 0 & \text{otherwise} \end{cases}$$

2.7 Caste

We include three dummy variables to capture the caste/tribe of an individual, called ST for the scheduled tribe, SC for the scheduled caste, and OBC for the other backward class. Asset level may differ among different caste groups. The labour force participation rate can also differ among different caste groups due to difference in the opportunities available for them or different practices they follow.

$$\begin{aligned} \text{SC} &= \begin{cases} 1 & \text{if respondent belongs to Scheduled caste} \\ 0 & \text{otherwise} \end{cases} \\ \text{ST} &= \begin{cases} 1 & \text{if respondent belongs to Scheduled tribe} \\ 0 & \text{otherwise} \end{cases} \\ \text{OBC} &= \begin{cases} 1 & \text{if respondent belongs to Other Backward Class} \\ 0 & \text{otherwise} \end{cases} \\ \text{General} &= \begin{cases} 1 & \text{if respondent belongs to General category} \\ 0 & \text{otherwise} \end{cases} \end{aligned} \tag{1}$$

2.8 Education Level

A woman's educational attainment can influence both her marital prospects and her career path. Highly educated women may be more likely to marry partners with similar or higher education levels, who may also come from wealthier backgrounds. For this study, We created the following categories: No Education, Primary Education, Secondary Education and Higher Education. Therefore, We included three dummy variables called No Education, Primary and Secondary to analyse impact of education on labour force participation rate of woman.

$$\text{No education} = \begin{cases} 1 & \text{if respondent has no education} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Primary} = \begin{cases} 1 & \text{if respondent has primary education} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Secondary} = \begin{cases} 1 & \text{if respondent has secondary education} \\ 0 & \text{otherwise} \end{cases}$$

$$\text{Higher} = \begin{cases} 1 & \text{if respondent has higher education} \\ 0 & \text{otherwise} \end{cases}$$

2.9 House Ownership

Decision making power of women in household can differ between rich and poor households. Higher decision making power can lead to higher chance of women joining work force. House ownership of women in household can be used as proxy for decision making power.Assuming house ownership leads to higher decision making power.

$$\text{House Ownership} = \begin{cases} 1 & \text{if respondent owns a house jointly or alone} \\ 0 & \text{otherwise} \end{cases}$$

2.10 Number of children below age of 5 : *Children below age of 5*

The presence of young children, particularly those under the age of five, can negatively affect women's labor force participation. This is primarily because young children require significant care at home, and societal expectations often place the responsibility for this care on mothers. Consequently, women with young children may face challenges in balancing childcare duties with paid employment, potentially leading them to reduce their work hours or leave the workforce altogether. Raising young children also comes with significant expenses related to childbirth, childcare, and their basic needs. These expenses can strain a household's budget, limiting their ability to save or invest. Additionally, families with young children might prioritize essentials over durable goods often used to calculate wealth quintiles further impacting this measure.

2.11 Number of living Children

As the number of children a woman has increases, the financial necessity associated with supporting a larger family may lead to a higher Labor Force Participation Rate (LFPR).It can directly impact her ability to work, particularly when children are young. We have already accounted for this effect by including the number of children under five in the model.

2.12 Husband's Employment Type : *Salaried Job*

A husband's employment status, particularly whether he holds a salaried position, can influence both a wife's labor force participation and the couple's overall household assets. We have made a dummy variables to capture this effect. This is done based on question which categorise husband's work into different groups(professional, clerical,

managerial, sales, technical, household and domestic services, and agriculture).

$$\text{Salaried Job} = \begin{cases} 1 & \text{if respondent's husband is working in clerical} \\ & \text{professional, technical or managerial job} \\ 0 & \text{Otherwise} \end{cases}$$

3 Descriptive Statistics and Observation

Variable	Obs	Mean	Std. Dev.	Min	Max
LFPR	61261	.374	.484	0	1
Rich	61261	.587	.492	0	1
House Ownership	61261	.508	.5	0	1
Husband Employed	61261	.844	.363	0	1
Primary	61261	.148	.355	0	1
No Education	61261	.318	.466	0	1
Secondary	61261	.422	.494	0	1
Christian	61261	.072	.258	0	1
Hindu	61261	.779	.415	0	1
Muslim	61261	.098	.297	0	1
OBC	61261	.411	.492	0	1
SC	61261	.196	.397	0	1
ST	61261	.193	.394	0	1
Age	61261	35.934	7.114	25	49
Number of living Children	61261	2.468	1.346	0	13
Children below age of 5	61261	.568	.847	0	9
Salaried Job	61261	.102	.303	0	1

Table 1: Descriptive Statistics

Variables	Rich	Poor
LFPR	32.91%	43.81%

Table 2: LFPR in rich and poor category

From this table, we can see that labour force participation of married working age women is lower in rich households. **We will run regression to analyse whether likelihood of married women working is lower in rich households when we control for other factors**. Most of variables we used in analysis is dummy variable. We have excluded 92 observations in order to ensure there is at least 2 individuals from same village to include village fixed effects. There is 61261 observation in total after deleting observations for missing variables for any of the above variables.

4 Model

The primary objective of this paper is to estimate effect of asset level on labour force participation rate of working age married woman. Our base model specification is as follows

$$LFPR_{i,v} = \alpha + \beta Rich_{i,v} + \sum_{k} \delta_k x_{k,i,v} + \epsilon_{i,v}$$

In the above equation, i refers to the individual, v indicates the village/CEB of the individual. Rich is a dummy variable used to analyze how differences in asset level change the likelihood of women working. It takes a value of 1 if the individual belongs to the 3^{rd}, 4^{th}, or 5^{th} wealth quintile and 0 otherwise. 'x' represents the set of k control variables, and ϵ represents the unobservables. We are examining whether there is a change in the likelihood of a married working age woman working when she belongs to a higher wealth quintiles.

NFHS 5 adopted multistage cluster sampling. First, Primary Sampling Units (PSUs)

are chosen from each stratum, which are Villages for rural areas and Census Enumeration Blocks (CEBs) for urban areas. Then, households are selected within each PSU. Therefore, considering the way the sample is designed, clustering has been done at the level of village in rural areas and census enumeration blocks in urban areas. **We use robust standard errors by clustering at the village/CEB level**. Furthermore, in order to make a statement about the population, we use women's individual-level sample weights provided by the NFHS 5 in all specifications.

Starting from the second specification, we also include village/CEB fixed effects in order to account for the unobservable characteristics of the village/CEB that correlate with asset level and are also relevant in determining labour force participation rate.

$$LFPR_{i,v} = \alpha + \beta Rich_{i,v} + \sum_{k} \delta_k x_{k,i,v} + \sum_{v=2}^{n} \tau_v + \epsilon_{i,v}$$

Our second specification controls only for village fixed effects. In the third specification, we add controls for individual characteristics in addition to village fixed effects. The fourth specification includes controls for family characteristics such as religion and caste, along with the individual and village-level controls.We will do **OLS estimation** of model with assumption of exogeneity. Exogeneity implies asset level is not correlated with error term.

5 Results and Interpretation

In this section, we will discuss our main regression results, i.e. represented in Table 3.

We focus on specification (4) as our main model since it incorporates controls for individual characteristics, household characteristics (Caste, Religion), and village-level characteristics. The coefficients of control variables had the expected signs.This

result holds only for married, working-age women(25-49). We will first examine the effect of each control variable on labour force participation rate, keeping everything else same.

These results are based on the 4^{th} specification as it controls for all observable characteristics. An individual's age positively impacts the likelihood of participating in the labor force, but this effect diminishes as women get older (indicated by the negative coefficient of Age^2). The number of young children below five hinders a woman's likelihood of working, likely due to childcare demands. However, the total number of children has a positive association, suggesting the need for additional income in larger families. Additionally, having a working husband increases the likelihood of a wife participating in the labor force. This may be due to the fact that non-working husbands generally carry a stigma about their wives working when they are at home compared to working husbands. However, the model suggests a negative effect on the likelihood of an individual participating in the labor force if the husband holds a salaried job.

Education level plays a role as well. Compared to women with higher education, those with primary or secondary education have a lower likelihood of working. Muslim women have a lower likelihood of working compared to the reference category (other religions). Caste and house ownership show interesting patterns. Women from OBC, SC, and ST communities have a higher chance of working compared to the general category. **The explanatory power for all specifications ranges from 0.007 to 0.351.**

In the discussion that follows, We focus only on the key variables in question. We begin with the simplest model (column 1), regressing LFPR solely on a wealth dummy variable ("Rich") indicating the top three wealth quintiles. This model finds a negative and significant coefficient for "Rich," suggesting that women in the highest wealth categories are less likely to work compared to those in the lowest wealth quintiles. However, when village/CEB fixed effects are included in column (2), the coefficient of "Rich" becomes more negative while retaining its negative sign and significance. This implies that individual belonging to higher wealth categories have

lower likelihood of working compared to those in the lowest wealth quintiles, when controlling for village characteristics. Hence, fixed effects strengthen the relationship between Labour force participation rate and asset level, controlling for everything else. It implies that inter-village variation in rural areas and inter-CEB variation in urban areas was dampening the effect of asset level on labour force participation rate of married working age women.

Specifications (3) and (4) introduce control for individual characteristics while maintaining village/CEB fixed effects. The key difference between these models is the inclusion of family characteristics (caste and religion) in specification (4). Notably, the coefficient of "Rich" remains negative and significant in both models. However, compared to the model with only village/CEB fixed effects, the "Rich" coefficient becomes **less negative** when individual characteristics are controlled (specifications 3 and 4). This weakening becomes even more pronounced with the inclusion of family characteristics (specification 4). The relation ship between asset level and labour force participation is weakened by individual and family characteristics.

As hypothesized, the results imply that **the likelihood of a married working-age woman participating in the labor force decreases when she belongs to a richer household compared to a poorer household**, controlling for all other variables. The results presented above rely on the assumption of exogeneity for the "Rich" variable. Unobserved variables could potentially lead to omitted variable bias, which will be discussed in more detail within the limitations section.

[1]In Appendix, we present the results from the regression analysis without excluding the 92 observations. Despite their inclusion, a negative relationship persists.

VARIABLES	(1) LFPR	(2) LFPR	(3) LFPR	(4) LFPR
Rich	-.082***	-.104***	-.087***	-.076***
	(.007)	(.008)	(.008)	(.008)
House Ownership			.012	.011
			(.008)	(.008)
Husband Employed			.141***	.139***
			(.009)	(.009)
Primary			-.022*	-.026*
			(.014)	(.014)
No Education			-.002	-.01
			(.013)	(.013)
Secondary			-.054***	-.056***
			(.012)	(.012)
Age			.044***	.044***
			(.005)	(.005)
Age^2			-.001***	-.001***
			(0)	(0)
Number of living Children			.01***	.01***
			(.003)	(.003)
Children below age of 5			-.039***	-.039***
			(.004)	(.004)
Salaried Job			-.036***	-.036***
			(.012)	(.011)
Christian				.016
				(.038)
Hindu				.035
				(.025)
Muslim				-.06**
				(.029)
OBC				.047***
				(.01)
SC				.086***
				(.011)
ST				.095***
				(.016)
Constant	.409***	.422***	-.524***	-.604***
Village/CEB FE	No	Yes	Yes	Yes
Cluster	Yes	Yes	Yes	Yes
Observations	61261	61261	61261	61261
R-squared	.007	.323	.347	.351

Robust standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Table 3: Regression Results

6 Robustness and Heterogeneity

6.1 Robustness

We try and show the robustness of the model to omitted variables through bound analysis suggested by [3]Oster (2017). We have considered the bound analysis on the coefficent of our primary regressor "Rich". The results for the bound analysis is given in the following table, it is based on regression (4) of table 3 above:

Coefficient of Rich					
			Identified (estimated bias)		
			$R^2_{\max} = .4563$		$\delta = 1$
	Uncontrolled	**Controlled**	β_s for $\delta = 1$	δ for $\beta_s = 0$	$R^2_{\max}$ for $\beta_s = 0$
β_s	-0.08242	-0.07589	-0.06811	2.12	0.577
R^2	0.007	0.351			

Table 4: Bound Analysis

Firstly, note that the uncontrolled β and R^2 matches exactly with column (1) of table 3. This is because the totally uncontrolled regression is the one where only Dummy "Rich" is taken as an independent variable and there are no fixed effects or other control variables. The bound analysis takes the uncontrolled regression as a comparison to the final outcome.

Oster suggested an upper bound for R^2 to be taken as $R^2_{max} = min\{1.3 * R^2_{controlled}, 1\}$, which signifies a good estimate about the extent to which the omitted variables explain the variation in the dependent variable, the rule suggested by Oster has good empirical justifications.

We have shown the estimate of bound on the coefficient of "Rich" under the assumption that $\delta = 1$ which signifies that the unobservables are as important as the observable variables. If the bounded set contains zero, i.e. the resultant beta shows a change of sign then the robustness is under question. However, as we can see in the table above, **the resulting beta is still negative**, the effect of belonging to rich wealth quintile on likelihood of women joining work force is considered robust.

We also try to reinforce our results by predicting the value of δ needed to make $\beta = 0$ for $R^2_{max} = .46$ which we get to be **2.12** which means that if the unobservables are almost 2.12 times more important as the observables in explaining the variation in the dependent variable then our bound will include zero and there is a problem of robustness. Usually, an upper bound of $\delta = 1$ is taken to examine robustness, i.e. anything higher than one is considered robust. Since, the δ in our analysis is higher, this reinforces the robustness of the model to omitted variable bias

Alternatively, We show that R^{max} **needed to make** $\beta = 0$ **when** $\delta = 1$ **is 0.577**, almost 1.7 times the R-square from the controlled regression. This indicates that coefficient of "Rich" is robust to potential omitted variable bias

6.2 Heterogeneity

Under heterogeneity analyses, we first explore which sub-groups based on education level are driving our main results. we estimated regression specification (4) for each education subgroup: no education, primary education, secondary education, and higher education. The results reveal a significant negative coefficient for the "Rich" variable in the no education, primary, and secondary education subgroups. However, the coefficient becomes insignificant for the higher education subgroup. **This suggests that the overall negative relationship between asset level and labour force participation rate is primarily driven by individuals with lower levels of education (no education, primary, and secondary)**.We present the complete results for heterogeneity below in Table 5.

VARIABLES	No education LFPR	Primary LFPR	Secondary LFPR	Higher LFPR
Rich	-.063***	-.057*	-.098***	.048
	(.017)	(.032)	(.015)	(.059)
House Ownership	.017	.016	.006	.03
	(.015)	(.03)	(.014)	(.035)
Husband Employed	.165***	.156***	.095***	.075**
	(.018)	(.042)	(.016)	(.034)
Christian	-.061	.077	.001	.097
	(.093)	(.177)	(.068)	(.119)
Hindu	-.042	.119	.045	.042
	(.054)	(.107)	(.046)	(.078)
Muslim	-.09	-.033	-.041	-.047
	(.059)	(.125)	(.056)	(.105)
OBC	.05**	.004	.048***	-.009
	(.025)	(.045)	(.017)	(.041)
SC	.094***	.076	.079***	.008
	(.028)	(.049)	(.02)	(.048)
ST	.064*	.045	.074**	.187
	(.033)	(.066)	(.032)	(.117)
Age	.056***	.053**	.04***	.037
	(.01)	(.023)	(.009)	(.024)
Age^2	-.001***	-.001***	-.001***	0
	(0)	(0)	(0)	(0)
Number of living Children	.016***	.009	.013**	-.016
	(.004)	(.011)	(.006)	(.02)
Children Below 5	-.036***	-.028	-.046***	-.062***
	(.007)	(.019)	(.008)	(.019)
Salaried Job	-.102***	-.093*	-.077***	.048
	(.036)	(.055)	(.021)	(.03)
Constant	-.793***	-.831*	-.538***	-.56
	(.194)	(.424)	(.176)	(.452)
Village/CEB FE	Yes	Yes	Yes	Yes
Cluster	Yes	Yes	Yes	Yes
Observations	17723	6184	24323	4806
R-squared	.486	.555	.436	.471

Robust standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

Table 5: Hetrogeneity Results

7 Limitations

7.1 Omitted Variable Bias

Our results presented so far relies on the assumption of no correlation between unobserved factors and asset level. This assumption might be violated due to the limitations of cross-sectional data. Unlike panel data, which allows controlling for unobserved individual characteristics through individual fixed effects, cross-sectional data lacks this ability.

One such unobserved characteristic could be the **family background in which a woman grew up**. If women come from families where female labor force participation is common, they might be more likely to join the workforce themselves. Additionally, family background could also influence the asset level of the household they marry into. Consequently, estimates of the effect of asset level on a married woman's labor force participation, without controlling for family background, might be biased. We have previously employed Oster bounds analysis to assess the robustness of our findings to omitted variable bias.

8 Conclusion

A highly statistically significant and negative relationship between labour force participation rate and asset level of household was found. This relationship is robust to the inclusion of control variables, although dampening to some extent.This relation ship doesn't hold in subgroup where women are higher educated.

References

[1] Farzana Afridi, Taryn Dinkelman, and Kanika Mahajan. "Why are fewer married women joining the work force in India? A decomposition analysis over two decades". In: *Journal of Population Economics* 31.3 (2018), pp. 783–818.

[2] Stephan Klasen and Janneke Pieters. "What explains the stagnation of female labor force participation in urban India?" In: *World Bank Economic Review* 29.3 (2015), pp. 449–478.

[3] Emily Oster. "Unobservable selection and coefficient stability: theory and evidence". In: *Journal of Business & Economic Statistics* (2017), pp. 1–18.

Appendix

We have run same regression as in table 3 without excluding individuals we have excluded in main regression for controlling village fixed effects. The negative relation between asset level and labour force participation rate still holds. All the other controls have similar sign as in Table 3.

	(1)	(2)	(3)	(4)
VARIABLES	LFPR	LFPR	LFPR	LFPR
Rich	-.082***	-.104***	-.087***	-.076***
	(.007)	(.008)	(.008)	(.008)
House Ownership			.012	.011
			(.008)	(.008)
Husband Employed			.141***	.139***
			(.009)	(.009)
Age			.044***	.044***
			(.005)	(.005)
Age^2			-.001***	-.001***
			(0)	(0)
Constant	.408***	.422***	-.524***	-.604***
	(.006)	(.005)	(.091)	(.099)
Village/CEB FE	No	Yes	Yes	Yes
Cluster	Yes	Yes	Yes	Yes
Observations	61353	61353	61353	61353
R-squared	.007	.324	.348	.352

Robust standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1