Health Econometric: Uncovering the Anthropometric Behavior on the Women's Labor Market

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Abstract

Exploring current literature which assess relations between cognitive ability and height, obesity, and its productivity-employability effect on women's labor market, we appraised the Argentine case to quantify for social-physical interactions which involve anthropometric and traditional economic variables. Hence, an anthropometric Mincer approach has been adapted by using probabilistic and censured econometric models which were developed for it. There has been found evidence that could be understood as the existence of discriminative behavior on the obese women to market entrance; besides, a good performance of women height as an unobserved approximation of the cognitive ability measure to explain feminine productivity.

Keywords: Height, Obesity, Anthropometric Mincer, Discrimination.

JEL Classification: J24 I12 C34

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1 Introduction

The physical appearance has always had an important role determining the develop of the social behavior of every individual, since childhood to the old ages, the human being always has depended of its biological prop, and indeed an interesting topic of research to shed light by founding how the anthropometric information could be affecting the labor market performance. In this work, we intend to unwrap these anthropometric factors which could have significant effects on excluding or including women on the labor market, by seeking theirs influence on labor opening and productivity performance of women between 16 and 49 years-old in Argentina, through an anthropometric perspective throughout this paper. Thereby, we are particularly interested in assess the anthropometric information provided for an Argentine health-aimed survey, the corner stone of our paper to obtain evidence accordingly to the anthropometric-economic hypotheses to be presented.

By way of Mincer's earnings function, Mincer (1974, [23]), which is one of the success stories in labor economics; nevertheless, regarding the omitted variables bias we have the feeling that this is not enough to explain earnings. For instance, if we consider goodness of t measures that are usually not higher than 0.5 and likewise empirical evidence demonstrates that further personal characteristics are important for earnings determinations when "classical" variables had been contained into Mincer's analysis.

In this sense to improve Mincer's estimation, our central goal is to comprehend and explore whether women's anthropometric variables contribute or not to determine patterns in labor market by regarding the wage perception for each region as well as each skill sector, and how theirs effects may differ between demographic and anthropometric features onto earnings gradients.

In order to evaluate the effect of tallness and obesity traits over labor market, we will have been using a probit along with a heckman censured model; both of these commonly used models in labor economics although in our case by including anthropometric variables. Basically we attempt to explore two basic issues:

(i) Pursue eventual clues of discrimination for women highlighting what body mass index and waist circumference variables would tell to us.

(ii) Considering height accord with an ability proxy and a good instrument for unobserved ability measure, an anthropometric Mincer approach would be implemented to quantify the height-stature influence through both censured and probabilistic models.

Assuming that the anthropometric measures are playing a role to determine women labor market performance, variables as body mass index, human height-stature and waist circumference were taken to quantify theirs effect. To appraise all these factor which could be conditioning feminine labor market opening, a Probit model would be rightly deployed to control by means of demographic, economic and now anthropometric variables, that affect market employability. A complete country regression, would be made along with for every region by looking for particular labor regional behavior. Afterwards it, a censured selection model will be deployed to appraise the interactions between productivity and anthropometric condition.

The rest of this paper is organized as follows. In Section 2 there will has placed the theoretical background where related literature shall be presented. Section 3 deals with the description of data source and the discussion of preliminary evidence based on unconditional and basics statistics analysis as well as the setup of the hypothesis bunch. Section 4 reveals the anthropometric Mincer framework. Section 5 concentrates on estimating probability models for employment for all country and each region, which shall try to assess women employment chances of market entering, the particular effect of multiple factors to determine labor wage perceived and what it means upon underlying discrimination terms. Earnings equations are presented and estimated in Section 6, where sample selection problem will be discussed and accounted through an anthropometric two step Heckman's approach considered for every jobs type; and Section 7, for ultimately conclusion and a discussion concerning to found evidence.

2 Theoretical Background

2.1 Obesity and its Labor Meaning

Seeking for obesity discrimination clues on labors markets, we found large theoretical literature related to this topic, within the mainstream, Cawley-Danziger (2004, [7]) found that high body weight is an important barrier to labor market success specially for white women than for Afro-American women. On the first mentioned group a negative correlation was founded between weight and labor market outcomes such as employment, hours worked, and earnings. Nevertheless, among Afro-American women, weight is neither correlated with employment, hours worked, nor earnings, though it is with the percentage of months had spent on welfare assistance between survey's interviews; hence, by providing suggestive evidence that these differences between white and Afro-American women in the relationship between body weight and labor market outcomes are partly due to differential weight-based discrimination to labor entrance.

In other labor-obesity addressed paper for the U.S. labor market analysis, Bhattacharya-Bundorf (2005, [3]) found that a substantial part of the lower wages among obese women attributed to labor market discriminatory behavior can be explained by the higher health insurance premiums required to cover them.

To quantify better obesity measures, Cawley-Burkhauser(2006, [6]), in other U.S. based survey, on the flaws of the body mass index (BMI) to measure real fatness, because that can not differentiates between muscle and fat tissue, had shown that while BMI is positively correlated with the probability of employment disability when body mass is divided into its components: fatness, positively correlated with labor disability while fat-free mass –such as muscle– negatively correlated with, backing up the existence of obesity based discriminative behavior.

2.2 Height and Earnings

Diving into the huge anthropometry and social literature, it has long been recognized that taller adults hold jobs of higher status and, on average, earn more than other workers. Gowin (1915, [10]), presents survey evidence documenting the difference in the distributions among heights of executives and the "average men". It also compares the heights of people differing status in the same profession, finding that bishops are taller on average than preachers in small towns, and sales managers are taller than salesmen, with similar results for lawyers, teachers, and railroad employees.

A large number of hypotheses have been put forward to explain the association between height and earnings. In developing countries, the height premium in earnings is often attributed to the greater strength and better health that accompany height [11, 26]. In developed countries, a fistful researchers have emphasized factors such as self-esteem [8, 17], social dominance [14, **?**] and discrimination [18, 20].

More recently, in a paper of Persico, Postlewaite and Silverman (2004, [24]), through extensive height and wage studies, suggest that boys who are taller during adolescence are more likely to participate in social activities that build human capital. They postulate that adolescent experiences are responsible for the higher earnings observed on taller men in adulthood, so that those who are short as teenagers have lower earnings, even if their stature "catches up" by adulthood. Focusing on white males, their principal outcome is that the teen height, but not the adult height is positively significantly correlated with log wages when controlling for variables such as education, work experience, race, gender, region, industry, occupation, family and school background. If so, tall men who were short in high school earn like short men, while short men whom were tall in high school earn like tall men. They believe that tall high-school kids learn to think of themselves as leaders and thus become self-confident teenagers, those who are more likely to join social groups where they learn to interact with people, an important characteristic in the working life.

2.3 Height and Cognitive Ability

While positive correlation between body height and cognitive ability has been documented in studies stretching back barely a century [28], the precise links between height and cognition are still not well understood. A paper work on the determinants of cognitive ability suggest an important role for nutrition, which may prove to be a significant link between height and intelligence [19, 16]. Other research branch affirms that there may be chemical channels that influence both height and cognition. Work on insulin-like growth factors suggests that these may affect body growth meanwhile also influencing areas of the brain in which cognition occurs [2].

Despite genes are key determinants of individual height, many studies suggest that differences in average height across populations are largely due to environmental factors [26]. Beard and Blaser (2002, [1]) who considered evolution time, the marked increase in heights observed throughout the developed world during the 20th Century occurred too rapidly to be due to selection and genetic variation.

Although recent researches on the genetic ties between height and intelligence show mixed results. In a Norwegian twin study suggests that approximately a third of the correlation between height and intelligence may be due to overlapping genetic factors [27]. However, other work on Finnish twins finds no evidence that the correlation between height and educational attainment is due to genetic overlap [25]. Magnusson et. al. (2006, [20]), comparing first and second born biological brothers in Sweden, found that the taller brother was significantly more likely to attend higher education.

Following the cognitional channel to explain height premium, Case and Paxson (2006, [5]) sought for height returns by using the NHIS[1] survey for U.S. and the NCDS[2] for U.K. labor markets. Controlling by variables as measures of childhood cognitive test and anthropometric measures, they found that the return to height in earnings equations is mostly eliminated by adding cognitional test data, consistent with the hypothesis that economic returns to height are the result of correlation between height and cognitive ability a correlation that is early evident in life and remains throughout. In other words they propose a simply explications saying that on average, taller people earn more because they are smarter. Suggesting that as early as age 3, before schooling a person had had a chance to play a role, taller children perform significantly better on cognitive tests. Therefore, tall children are much more likely to become tall adults[3]. As adults, taller individuals are more likely to select into higher paying occupations that require more advanced verbal and numerical skills and greater cognitive abilities, for which they earn handsome returns.

They obtained estimates of earnings equations which indicate that the height premium in earnings is generally eliminated when measures of cognitive ability in childhood are included in the models, clear evidence of an ability-height replacement, and consequently providing direct evidence on the positiveness of covariance between cognitive ability and height is positive.

2.4 Anthropometric Measures

The most common definition of obesity used in the social science literature is based in Body Mass Index (BMI): BMI greater or equal than 30. Nevertheless, there are a variety of obesity definitions, corresponding to various

[1] National Health Interview Survey

[2] National Child Development Study

[3] They also affirmed that correlation between height in childhood and adulthood was approximately 0.7 for both gender, with 0.92 for girls relative to 0.77 for boys.

measures of fatness, the strengths and weaknesses of each definition of obesity depends certainly on the strengths and weaknesses of the fatness definition on which it is based.

Being the body mass index the ratio outcome coming from the relation among the weight ($\mathbf{W}$) and squared height ($\mathbf{H}$).

$$\mathbf{BMI} = \frac{\mathbf{W}}{\mathbf{H}^2} \tag{1}$$

Accord to this gauges it respond the follow criteria:

$$\mathbf{BMI}(\mathbf{H}, \mathbf{W}) = \begin{cases} \text{Obese} & \text{if} \quad \mathbf{BMI} \geq 30 \text{ kg./cm.}^2 \\ \text{Non-Obese} & \text{if} \quad \mathbf{BMI} < 30 \text{ kg./cm.}^2 \end{cases}$$

The use of BMI to classify people as obese also results in false positives because people who are muscular but not fat have a higher BMI; according with recent studies these false positives totalled 9.9 percent of non-obese men and 1.8 percent of non-obese women ([6], p. 4.). Despite this flaw on BMI to mark women is less likely to be inaccurately classified as obese than men on the basis of BMI because they are less likely to be heavily muscular.

There are a wide agreement in medical literature that BMI measures are seriously flawed because it can not distinguish fatness from fat-free mass such as muscle and bone. Findings from medical literature also suggest that it is not just the amount of fat that matters, but also the location or distribution of that fat. In particular, abdominal visceral fat (i.e. that located around the internal organs) is associated with an elevated risk of morbidity ([6], p. 7.). We do privilege waist circumference measure which considerate an obese woman alike one on who hers abdominal perimeter circumference threshold equal or larger than 88 cm.

$$\mathbf{WC}(\mathbf{cm}) = \begin{cases} \text{Obese} & \text{if} \quad \mathbf{WC} \geq 88 \text{ cm.} \\ \text{Non-Obese} & \text{if} \quad \mathbf{BMI} < 88 \text{ cm.} \end{cases}$$

Naturally, the measure of human height is measured on centimeters. Remarking the height's evolution, after a period of intense growth from ages 0 to 3, growth becomes relatively stable at approximately 6 cm. a year until adolescence, at which point the AGS[4],([5], p. 3.), accelerates growth until its peak velocity by approximately 10 cm./year.

Adult height is also sensitive to environmental conditions experienced in childhood. The period from birth to age three is generally identified as the most critical to adult height. The speed of growth is more rapid during this

[4]The Adolescent Growth Spurt.

period than at any other during the life time, and nutritional needs are the greatest at this point. Environmental conditions in childhood also affect the timing of the growth patterns described above, for instance infections can be frequent and severe in early childhood, and these can impair growth. The onset's age of the AGS has fallen over the past two centuries, in step with a fall in age at maturation. In late 19th Century Europe, adult height was attained at age 26, remarkably different from today's estimates of age 18 for boys, and age 16 for girls [1]. Clearly people's height, within their interaction group, remain as an important factor to determine social behavior.

3 Data, Hypotheses, and Preliminary Evidence

Using data surveyed in the middle of 2005 by means of the ENNyS, the castilian acronym of "Nutritional and Health National Survey", and taking the section of women among 10 to 49 years-old for every Argentine region, we were proceed through thoughtful analysis not merely considering classical information provided as education, aged, offspring, total families members, family salary perceived, qualification skills of their job, head household labor status and so on; although besides those we have taken anthropometric gauges as well.

Our sample consisted in 6193 women distributed across the country, on it were being gathered demographic, economic and anthropometric information. The ultimate mentioned the central feature aimed of our current effort, where anthropometric data was accrued accord internationals standards of measures norms [29].

Despite wonderful information displayed by the ENNyS, important limitation there were on the fact that it not presents panel structure, only one cohort sample is available; probably, in further years we would contain with anthropometric panel data structure able to enhance studies with this scope. However, by far the mainly drawback of our data is that it has not been accruing for individual wages, but it does through the total family income records.

Basically we shall be attempted to deal with the following hypotheses:

(i) Obese women employees earn, on average, less than thinner women.

(ii) Taller women employees earn on average more than others women workers.

(iii) Obese women have less probabilities to be employed.

(iv) The relation between the height and the labor market outcomes are mainly due to the correlation of human height with unobserved ability. Therefore, human height might be quantifying better the earnings regressions functioning.

From 6193 surveyed observations, only 4906 were taken by theoretical assumption, non response, and incongruent observations. Had been discarded all those feminine younger than 16 years-old, supposedly reaching a complete AGS at this age, which in observations terms meant to drop out 280 observations. Unintelligible observations[5] from waist circumference (989), height

[5] Corresponding to *Don't know, Non respondent and others.*

(14) and body mass index (1) measures along with a few missing observation from the family monetary income perceived[6] were left aside, totalizing 1287 dropped observations.

Given that only the total salary per family received is available in the survey, data naturally include also yonder wages perceived from males breadwinner who contribute to the total family income. To cope with this, we would have accounted only for those women who reported have been working at least 1 hours during the last week[7] before record survey's date, as long as unless reported absence reasons did not implicate lose their working condition[8].

Approaching as possible we can to the individual feminine wage perception; making its definition insofar enough restrictive to ensure us a nearer individual real income perception. According with former, we proceed with the next strategy to figured out the individual woman's wage by taking proportional wages for those who had reported working and at the same time have never accounted for male's contributions within their family cluster; dubbing it the woman's *quasi-wage* as $\boldsymbol{w_i}$, such that.

$$w_i = \frac{itf_j \ I(w_{ij} > 0 \mid m_j = 0)}{n_j} \quad \forall \ \ i = 1... \ N \ ; \ j = 1... \ M \tag{2}$$

Where N is the total number of worker's women, M the number of family clusters has been taken, n is the number of working people whatever be their gender at the $\boldsymbol{j}$ family cluster, the woman's quasi-wage of this family will be a proportion of the total family income[9] ($\boldsymbol{itf}$), regarding before whether this woman surveyed reports had working within last week ($\boldsymbol{w_{ij}} > 0$) or not; besides, having reported monthly total earnings greater than zero[10] into her family cluster $\boldsymbol{j}$. The total family income ($\boldsymbol{itf}$), which has included the specifically quasi-wage of this observed woman $\boldsymbol{w_i}$, also regarded that no one head male had reported salary contributions (i.e. $\boldsymbol{m_i} = 0$) within the cluster this women pertains.

In this manner, we neutralized the head male's wages for families when woman not has perceive wages of neither type. However, we are supposing that all women into a family bunch who reported perceive wage are gaining the same proportionally salary independent of their relative condition within

[6] 989, 14, 1 and 3 observations excluded respectively.

[7] Questionnaire 1, question 14, ENNyS.

[8] Vacancy-license, personal, strike-suspension and others; options 2, 3, 4, and 5 respectively, question 15 same questionnaire.

[9] The total family income perceived per family cluster in monthly salary concept.

[10] Actually greater than at least 10 monthly pesos per family perceived.

their family cluster. The number of observations that perceive income using this scheme fall to only 1013, quite lesser than 2358 observed women[11] on behalf of more representative and accurate estimations, regardless male's contribution restriction on women's quasi-wage definition.

Towards the first descriptive evidence presented in Table 1, which appraises the basics means of the women's quasi-wage, and the anthropometric proportions by describing the data to be used then through conditional analysis. The results from this appreciation, are clearly our first social picture and at the same time the preliminary evidence of our anthropometric labor situation helping us to understand the role played by anthropometry on women's labor market.

As Table 1 shows us the women's quasi-wages and the anthropometric gauges grouped by educational, aging, and obesity-height traits with weighted means for all country data. First column corresponds to the average wages for every feminine category where there are an 20.7% of women employed on formal market who declared to perceive wages without a head male, the rest (79.3%)[12] are perceiving salary although with a head male contributor –being either it husband or coexisting partner–, are out of the labor market, not searching jobs, or not willing for (inactive), or those who are unemployed and searching jobs, and a handful of discarded observation.

Suddenly, the average quasi-wage earnings from managerial jobs was quite lower than those from supervisors and technician, to grasp this incoherence we looked up for the corresponding questions[13] on the ENNyS by asking: *"Which is the skill qualification of your job?"*. Probably a broadly sight of "manage-direction" definition was judged for those women who had chosen the item 6 *"Direction/Managerial Tasks"*, by including a wide meaning of manage, since little firms command positions to public managerial activities as well, and not exclusively allude to CEO positions.

According to our insight and one of the presented hypotheses, technician and professionals women are more taller on average, sliding us an initial hint of cognitive ability linked to height and earns. In a glimpse, we can also find that in average obese women through waist circumference and BMI gauges gain lower wages than theirs thinner and weightless works colleagues. The prevalence of obesity analysis, can be seen on the Table 1 as an important difference on the obesity proportions depending by the yardstick that might

[11] Despite actually 2542 women have reported work, were discarded those families who reported incoherent $\boldsymbol{itf}$, lower than ten pesos per family-month (16), or not declared perceive income (168)

[12] 1016 and 3890 respectively observations.

[13] Questionnaire 1, section 18 of ENNyS survey.

be taken to gauge it. The BMI has accounted a 17.9% of obese women prevalence; notwithstanding, when we consider the waist circumference measure, we bump into with an awesome 30.9% of obesity prevalence, almost twice than the previous obesity yardstick, perceiving a quite accurate lack for BMI which agrees with prior cited literature.

Likewise prior, though with height, cleaving the survey through the median[14], according with another hypothesis, the upper groups have higher averages returns than other shorter women; as a matter of fact, the height attempts give us somewhat more information about what determine women's wages on labor market.

[14] Genetics height differences between regions (for instance NOA has the lower median height in compare with others regions, with 2.2 cm. lower than GBA's median) not meant pattern changes from national trend, averages quasi-wage perceived remain higher for taller women at every region considered.

4 Anthropometric Mincer Framework

One of our hypotheses is that the associations between height and labor market outcomes are either due to the correlation of height with cognitional ability. Thus, the height effect in the labor market is not due to pure discrimination against shorter individuals, nor are they due to the greater strength or physical ability of taller people. Rather, the height premium is due to omitted variables bias. Hence, by way of height coefficient estimation, we expect reflect returns to unmeasured cognitive ability. On the other hand, our anthropometric interest compel us to grasp for clues of obesity discrimination as well. To catch both effects we proceed with the follow Mincer model fitted to an anthropometric variables usage.

$$w = X'\beta + Z'\alpha + \varepsilon \tag{3}$$

Follow the Case and Paxson (2006, [5]) approach by taking the height as ability although adding BMI-WC measures to delve for discriminative effect, we can reformulate the mincer onto this:

$$w = X'\beta + Z_h'\alpha_h + Z_o'\alpha_o + \varepsilon \tag{4}$$

Where $\boldsymbol{w}$ is the traditional log wages, the estimated height premium $\boldsymbol{\alpha_h}$; $\boldsymbol{X}$ as the classic demographic variables group and the $\boldsymbol{Z}$'s vector, which contain the anthropometric variables being $\boldsymbol{Z_h}$ the height related variables, and $\boldsymbol{Z_o}$ the obesity measures (i.e. BMI and WC). Including all the supposed relation among height-ability or obesity-discriminative behavior by embracing all the interaction within the unobservable term ($\boldsymbol{\varepsilon}$), the latter equation now stands as:

$$\varepsilon_i = \theta\eta_i + \delta\eta_i + e_i \tag{5}$$

Where $\boldsymbol{e}$ is the idiosyncratic component of earnings assumed to be orthogonal to height. Naturally, this abilities and discriminative coefficients representing the Mincer's errors are indeed unobserved, although assume that both ability types variables alike obesity discrimination are non orthogonal linked with height and obesity gauges.

Cleaving the framework able to include multiple kinds of ability as well as insofar of discriminative effects, all of which may have different correlation with height ([5], p. 9.). In that way suppose that there are two types of productive abilities: cognitive ability ($\boldsymbol{\eta^c}$) and physical strength ($\boldsymbol{\eta^s}$).

$$\varepsilon_i = \theta^c\eta_i^c + \theta^s\eta_i^s + \delta\eta_i^d + e_i \tag{6}$$

Being these two height related sorts of productivity: cognitive-ability ($\boldsymbol{\eta}^c$) empirically linked with heights ($\boldsymbol{Z}_h$), and physical-ability ($\boldsymbol{\eta}^s$) related as much with height as BMI-WC measures ($\boldsymbol{Z}_o$) . The discriminative unobserved effect ($\boldsymbol{\eta}^d$) has been assumed link up with BMI-WC measures in $\boldsymbol{Z_o}$ since the assiduous existent prior evidence discussed behind [3, 6, 7].

Having achieved the affirmation that height play a role reducing the earnings equations bias; we ought to be able of prove that the unobserved ability has a positive correlation with height; in this manner, we would be longing get cognitional information to cope with the present hypothesis, yet unavailable for us, we count instead with different jobs categories from blue collar to technicians and directive positions sorted in ENNyS survey, on which we can assume this are related with some kind of cognitional ability. By being written (3) the logarithm of the women's quasi-wage that a worker receives in occupation $\boldsymbol{j}$ is:

$$w_{nm} = X'_{nn}\beta_{nm} + Z'_{nn}\alpha_{nm} + \varepsilon_{n.m} \quad \forall\ i = 1,\ ..\ n\ ;\ j = 1,\ ..\ m \qquad (7)$$

Being $\boldsymbol{n}$ the number of surveyed women who perceive wages according to (2) and $\boldsymbol{m}$ the skill sorting for each occupation (i.e. from blue to white collar, technical or managerial job's type). The wage equation has the same form used above, but with returns to productive abilities that vary across different skill and occupations. And now having rewritten unobserved ability (6) for the quasi-wage occupation $\boldsymbol{w}_j$ by suppressing the individual subscript such that:

$$\varepsilon_j = \theta_j^c\eta^c + \theta_j^s\eta^s + \delta_j\eta^d + e_j \qquad (8)$$

Accordingly with literature which assumes that height is correlated with the number of productive abilities on occupational choice, we assume that the returns to these different abilities vary across occupations [13, 9], hence workers sort themselves into the occupations that yield the highest returns, therewith height is more strongly associated with cognitive ability than physical ability which assume in (6) such that $\boldsymbol{\theta_j^c} > \boldsymbol{\theta_j^s}$ (as Case & Paxson had proven empirically) then taller workers will sort into the occupation $\boldsymbol{j}$ that require greater cognitive skill rather than physical one. Given that $\boldsymbol{\theta}_j$ is not observable, yes it is by way of height, such that $\boldsymbol{\alpha_{hj1}} > \boldsymbol{\alpha_{hj2}}$ where occupation $\boldsymbol{j1}$ is assumed more cognitional intensive than $\boldsymbol{j2}$. Former hypothesis is going to be empirically tested on section 6 through a censured model of earning equations. On the next section through an anthropometric Probit model, will be trying to deal mainly with the obesity condition implications to account for obesity selection on the labor market's inclusion.

5 Anthropometric Probit for Labor Participation

Addressing the first conditional analysis which involve anthropometric measures. We estimate a probabilistic model to find how the height-obesity would be explaining the women's labor state. In this sense, we attempt to find some evidence of physical condition as an obstacle to labor opening given anthropometric and economics variables apiece individual.

By trying figured out the women's probability of being employed for an individual woman, there was created a dichotomic variable aimed to represent the received wage estimated alike a token of market presence, which indicates the salary perception of an specifical woman. To build our outcome variable, have been seized from survey respondents to *"Did you works within the last week at least one hour?"* [15], where the affirmatives answers are coded as one (i.e. Y_i=1) or does not subsequently follow of item 1 or 6[16], are coded as zero (i.e. Y_i=0). There were 2542 women who reported working condition, spotting this new variable as one.

This binary outcome is used as the dependent variable in our Probit regression model. We believe that a set of factors, such as age, marital status, education, and others family features, gathered all in the vector $\boldsymbol{X}$, and similarly with anthropometric one gathered on the $\boldsymbol{Z}$ vector to explain working status. Conformed our dependent variable, then we have:

$$\begin{aligned} Pr(Y=1|X,Z) &= \Phi(X'\beta, Z'\alpha) \\ Pr(Y=0|X,Z) &= 1-\Phi(X'\beta, Z'\alpha) \end{aligned}$$

The probability model is a regression such that:

$$E(Y|X,Z) = 0[1-\Phi(X'\beta, Z'\alpha)] + [\Phi(X'\beta, Z'\alpha)] \tag{9}$$

Letting be $\boldsymbol{\Phi}$ the cumulative density function for the assumed normal continuous probability distribution; it could be written as:

$$Pr(Y=1|X,Z) = \int_{-\infty}^{X_i'\beta, Z_i'\alpha} \phi(i)d(i) = \Phi(X'\beta, Z'\alpha) \tag{10}$$

The function $\boldsymbol{\Phi(.)}$ is a commonly used notation for the standard normal distribution.

[15] Referred to questionnaire 1, question 14, ENNyS survey.

[16] Questionnaire 1, question 15, option 1: *"Non want, wish or can't work"* (inactive person), and option 6: *"Don't get work."* (unemployed) ENNyS survey.

Once distributions supposes assumed, the itemize equations would be:

$$Pr(y_i = 1|X_i, Z_i) = X_i'\beta + Z_i'\alpha + \varepsilon_i \quad \forall \quad i = 1\ .\ .\ .\ N \tag{11}$$

Equation (11) means that the probability of individual $\boldsymbol{i}$ being employed given her characteristics, represented by vectors $\boldsymbol{X}$ and $\boldsymbol{Z}$ of dimensions $K.1$, is equal to the value of function $\boldsymbol{\Phi(.)}$ evaluated at some point $\boldsymbol{X_i'\beta}$ and $\boldsymbol{Z_i\alpha}$, where $\boldsymbol{\beta}$ and $\boldsymbol{\alpha}$ are also a $K.1$ vector of unknown parameters, to be estimated by maximum likelihood procedures.

Working status dependent variable ($\boldsymbol{y_i}$), defined as a binary indicator, equal to one for a working individual, regardless whether her had whatever job kind, first for all over the country regression, and then for every region as well, is trying to identified regional effects on the probability of being employed.

The individual characteristics to be considerate are inasmuch demographic as anthropometric kind. The $\boldsymbol{X}$'s vector contains a set of controls for characteristics that might be affecting occupational choice, independent of workers' non-time-varying productive abilities, it comprehend variables as: educational attained dummies, primary education achieved '**edupc**', incomplete secondary education '**edusi**', secondary education achieved '**edusc**', incomplete university level '**edusupi**', completed university education '**edusupc**', and current attendance status' dummy about her current educational attendance situation '**asistees**', age '**edad**', age squared '**edadsq**', the number of children alive for each family '**cant hij**', number of people coexisting within respective family bunch '**fam num**', the marital or coexisting partner status' dummy '**conviv**', whether the head male are working '**jtrab**', and the family propriety right status '**prop viv**' (i.e. owner or tenant family's condition). Besides, the regional dummies for the thorough country regression, and each particular region, such as '**cuyo**' for Cuyo region's dummy variable, '**nea**' North East, '**noa**' North West, '**pamp**' Pampeana and '**pata**' Patagonia. Geared to not fall in the dummies' trap we neither considered the incomplete primary educational nor the Greater Buenos Aires regional dummies as regressors.

The $\boldsymbol{Z}$'s vector comprises the anthropometric one, where '**talla**' is the height gauge in centimeters units, '**perime**' corresponds to waist circumference, '**imc**' the body mass index. The anthropometric dummies will also be dubbed as '**uppermed**', which accounts those individuals taller than the population median, '**perob**' based on waist circumference threshold, and the body mass index '**imcob**'. The two latter are signalling the obesity condition of individuals by way of above defined criteria.

Probit's results in Table 2 shown that women's wage perception is poorly explained by the regressors as indicated by the Pseudo R-squared. Alike the case of Greater Buenos Aires, Cuyo and Patagonia; the all country Pseudo R-squared is either small; a little bit more higher goodness of fit values are founded for NEA, NOA and Pampeana regions.

By according to what we could be expecting, complete higher education and age such as experience proxy are significant for barely all region excepting for Probit's estimation of Greater Buenos Aires where only the number of children and age were significantly found as benchmark to affect inclusion market probability, as is being seen on Table 2. Likewise, age effect as experience measure, has significantly positive effects on all regions by excepting Cuyo. Complete secondary educational dummy effect remains positive over all country and Pampeana's regressions, albeit the latter rather weaken than the aforementioned. Current attendance to an educative institution seems has highly correlations with jobs across the country, yet particularly for NEA's region.

Conversely, on the women's participation and employment probability, age squared has significantly decreased the chances to be employed. This negative outcome to squared experience might be understood inasmuch our sample only contains individuals until 49 years-old women. On the other hand, the number of woman's children variable abides as the mainly impairing factor on market entrance for all and each region excepting Cuyo.

Having the propriety right on her own dwelling family place, appearing has more incidence in Cuyo, NOA and Pampeana region's estimations; although, formerly has accounted for negative effect output. Regarding the country level regression for this variable, its effect is either positive and significative. The Male presence variable as the head earner in family cluster, has positive and significative effect on labor employability for all country coefficients, particularly with stronger impact on NEA's and NOA's regions particularly.

The anthropometric evidence provided for Cuyo was negative for the height variable (**talla**), and setting uncertainty up on prior explained hypothesis about height as an ability yardstick. Furthermore, formerly could arise a quest: are Cuyo markets seeking for compliant and submissive women or are them more interested or enthusiastic to delve a job?. Undoubtedly further research and a lot of work would be needed to carry out with this inquire.

Other regional-physical variable to be considered is the obese women's dummy (**imcob**) for NOA's region, positively daubed, appears having more market acceptance by women with body mass indices higher than 30; this seems to assert that NOA's labor market has preferred robust women; therefore, we would not say nothing about women's obesity discrimination in this region. Undoubtedly the paradoxical case understand to NEA's probability regression which has gathered positive returns to body mass index increments meanwhile was being significantly received negative outcomes from waist circumference variable, with equation (1) in mind, height probably becomes to play an positive underlying role on labor market's entry.

Perhaps the somber faded evidence of obesity discrimination towards labor market opening, rest on the negative effect of waist circumference variable, which indicate subtle clues of obesity discrimination over all Argentine women's labor market, regionally mentioned effect still remains significantly greater for NEA and Patagonia. Regarded the waist circumference importance on market opening, by plotting to appraise and visualize the marginal effect for an infinitesimal change in waist circumference, as is being seen in Figure 1. By setting the exogenous variables at their means at the same time as regional dummies are equaled to zero, can be distinguished on the all country regression, a downward slant which has subtly convex tail indicating that thinner women are considerably more likely to be employed than those women with higher waist circumferences who have lower probability of getting work. This downward slant on marginal effects could be suggested the presence of underlying obesity discrimination perturbations within a criterion of labor entrance selection.

6 Anthropometric Heckman's Selection Model

Presently section is aimed to study and discussing the mainly determinants of women's earnings in Argentina regarding anthropometric factors; moreover, the classical focusing on differences by skills abilities and the role played by educating and family-demographic environment to evaluate the women's quasi-wage as around all country as each region as well.

Accordingly prior, in this section we would be shedding some light on the determinants of the earning income for the Argentine's women among 16 and 49 years-old thorough all labor market as well as for every skill sector. Alike prior Probit model, although ushered to the earning productivity equation, our main goal is to explore in what extent education, family environment, and anthropometry trait help to explain the effects of those on quasi-wage gradients outcome.

A wide spread standing discussion related to estimation of Mincer's equations is the possibility that returns to education be biased due to omitted variables, especially those linked to individuals with innate ability[17]. Unfortunately, we do not have information available to control for this potentially harmful omission. Despite this hopeless affirmation, based on Case and Paxson (2006, [5]), who have used human height as an ability proxy manner, we expect to cope with this problem.

6.1 The Censured Problem

Classically, an often problem concerning estimation of Mincer's equations is that wages are only observed for working individuals, therewith ordinary least-squares (OLS) estimation could get biased estimators output whether, as expected, the mechanism that selects individuals in and out of the sample were correlated with potential earnings. Hence we use Heckman's two-step procedure [12, 30] to obtain consistent estimators avoiding eventual existence of sample selection. Proportions numbers to justify the latter deed, is presented the next model:

$$\begin{pmatrix} y_i \\ s_i \end{pmatrix} + \begin{pmatrix} X'\beta + Z'\alpha \\ W'\gamma \end{pmatrix} \begin{pmatrix} u_i \\ v_i \end{pmatrix}, \quad \begin{pmatrix} u_i \\ v_i \end{pmatrix} \sim NID(0, \sigma^2) \qquad (12)$$

Heckman's two-step method is based on the fact that the first equation of (12), for observations where merely $\boldsymbol{y_i}$ is observed, can be rewritten as

$$y_i = X_i'\beta + Z_i'\alpha + \rho\sigma v_i + e_i \qquad (13)$$

[17] A classical example in Card (1994, [4]).

Here the error term u_i is divided into two parts: one perfectly correlated with v_i, the error term in the equation for the latent variable s_i, and one independent of v_i. The idea is to replace the unobserved error term v_i in (13) by its mean conditional on $s_i = 1$ and on the explanatory variables W_i. This conditional mean is:

$$E(v_i|s_i = 1, W_i) = E(v_i|v_i > -W_i\gamma, W_i) = \frac{\phi(W_i\gamma)}{\Phi(W_i\gamma)} \tag{14}$$

The quantity $\phi(x)/\Phi(x)$ is known as the inverse Mill's ratio. In the first step of Heckman's two-step method, an ordinary Probit model is used to obtain consistent estimates $\hat{\gamma}$ of the parameters of the selection equation. On the second step, the unobserved v_i in regression (13) is replaced by the selectivity regressor $\phi(W_i\hat{\gamma})/\Phi(W_i\hat{\gamma})$, and regression (13) becomes:

$$y_i = X_i\beta + Z_i\alpha + \underbrace{\frac{\phi(W_i\hat{\gamma})}{\Phi(W_i\hat{\gamma})}}_{\lambda_i}\rho + \nu_i \tag{15}$$

Being the inverse Mill's ratio $\lambda = \phi(W_i\hat{\gamma})/\Phi(W_i\hat{\gamma})$ This "Heckman regression", as is often called, is easy to estimate by OLS and yields consistent estimates of β.

Regression (15), provides a test for sample selectivity as well as an estimation technique. The coefficient of the selectivity regressor is $\rho\sigma$. Since $\sigma \neq 0$, the ordinary t statistic for this coefficient to be zero can be used to test the hypothesis that $\rho = 0$, and it will be asymptotically distributed as $N(0;1)$ under the null hypothesis. Whether this coefficient is not significantly different from zero, the investigator may reasonably decide or not that selectivity becomes a problem and proceed to use least squares as usual.

Looking forward for empirical evidence and according with former concepts, we define the dependent variable as the log of labor quasi-wage for every feminine worker perceived for each family accordingly to (2), by being measured in Argentinean pesos of 2005. Earnings equations are assumed to be linear, and its corresponding coefficients measure the constant semi-elasticity of wages to marginal changes in the exogenous variables.

The regressors included in the selection equation, and estimated in the first step, are the same as in the employment probability model in the previous section. Regarding the second step or the Mincer's equation itself (or "pure" Mincer core) uses the prior defined log wages as endogenous variable, and almost all regressors used at the probabilistic equations, by excepting: the male head contributor condition (**jtrab**), –given its endogeneity on the women's quasi-wage variable construction– the propriety right on dwelling, and the married-connivance status' dummies (**prop viv**, **conviv**) as the enrolled numbers of dwelling for each family cluster (**fam num**), excluded these regressors the rest abided equal.

Table 3 reports estimation's results corresponding to Heckman's second step, but those who were omitted on selection equation since they are equivalent (at least for all country estimation) to the prior Probit's estimations which results in Table 2 not differ when is merely considering the first step of Heckman's procedure estimated.

Given the surveyed possibility to catch the different skills sectors by ENNyS, have been estimates not merely the Mincer's return for all women employees, but for every skill sector as well. By decomposing sectors by skill-cognitional insensitivity, log-wages for every specific job category has been made by constructing from non-skilled workers to operatives, technician, professional, and supervisors-managers[18].

Empirically, from 4906 observations, the censured model has taken 3214 for every skill category. All skill Heckit's regression have been taken only 672 uncensured observations, the 20.2% of regressed observations. In like manner 338, 193, 96, 23, 652 uncensured observations were respectively taken to everyone nonskilled, operative, technician, professional, and the spliced supervisor-manager censured regressions. Consequently, the progressive lack of observation for each next job's skill sector regarded not only meant less observed samples available for our estimation, collinearity problem either compel us to discard three coefficient[19] at professional sector where mere 23 observation remained after censured selection's process.

Firstly considered the utterly women Heckit's regression, how we could expect, all educational coefficients were significantly positive with earnings, as is being seen on Table 3. The middle educational attained levels (**edupc**, **edusc**) have highly significance on those blue collar women, since for all classes, operatives and managers-supervisors regressions have accounted for strong signification on superior-university education's variable.

The accomplished university dummy variable has had a positive response on earnings, barely doubling the secondary and college incomplete dummies variables coefficients. So that, higher educational levels imply even higher salaries, especially for operatives and manager-supervisor workers excepting for non skilled feminine sector. Nevertheless, latter has apparently been possessed lesser effect on professionals and technician job's classes, probably

[18] These both last categories have been melted to avoid collinearity problems; given the fact of relatively lack of observations.

[19] Referred to edupc, eduseci, and edusupi missing coefficients.

due the lack of uncensured observations on these categories. Educational attendance has significantly gathered with positive coefficients on all skill's regression, its stronger influence has fallen mainly on the operative as well as for manager-supervisor's log quasi-wages categories.

Squared age variable has significantly negative effect on the women's log-quasi-wages implying a non-linear association. Despite this linear effect, age variable having seemed a more robust influence than non-linear. Again the relatively short aging range of our data become into a difficult task by measuring non linear effects given its limited age catchment. The effect for age and age squared merely remains important on managerial-supervisor type of job's skill, where the age's coefficients were positive and significative. On this same skill's sector alike prior, but for age squared variable presents a little negative direction.

This results agree with those founded by Marchionni (2005, [21]), a similar effort on Argentina's labor market, although through a wider two gender scope where educational achievements, educational attainment and age have deeply significance on perceived women's wages enhancement. There earning equations also reported significative relations for all regional dummies, where the coefficients' direction and significance levels obtained has maintains quite similar to these estimated here[20].

The number of children at the women family seems to hinder the quasi-wage productivity: around 11% per son, specially upon operatives, and manager-supervisors. Taking a glaze on those, the first mentioned presents even bigger effect against operatives wages 22%, subsequent reported returns were similar to all sample's estimation (11%).

Similarly previous all country Probit's estimation, five geographic controls were added as regional dummies where all theirs gradient excepting Patagonia have reported perceiving lower significative return than Greater Buenos Aires, which was discarded allowing us to avoid the trap of dummies, with the highest coefficient values for NEA and Pampeana's regions.

Onset seeing the anthropometric variables, we collide with noteworthy evidence on the cognitional-ability explicative capability of height. As a matter of fact for those nonskilled, operatives, and technician women reported have been significative on their earning return's gradient, but as Case and Paxson (2006, [5]) had proven, they report different signs due to the cognitive selection. Accordingly with reported values, one centimeter taller blue collar has seeing decreased her income by 2.3% in average. Conversely, one operative or technician have seen increased their salaries by 4% and 7%

[20] See Table 3.

respectively. This is easy to see on Figure 2 where a negative slope can be distinguished for those nonskilled women, and a rising one as the operative as the technician worker. The height's dummy indicate a similar trend also including the height's significance effect on all sample regression and supervisor-manager as well. By considering any women whatever would be her job's class, being one taller than median, she would be gaining an average of 33% greater than her shorter colleagues. In the same manner, being an upper than median manager-supervisor woman, hers condition rises the expected quasi-wage perception by barely 30%. Looking up the height dummy, the blue collar category regression has significantly gotten a positive coefficient for nonskilled women taller than sample's median within her non skilled job's subgroup category, has increased the income perception around 51%, this may be associated with the fact that the majority of blue collar workers with highest wages pertain to the upper median blue collar group. In spite the fact that the height's coefficient presents a negative response to height increment.

These evidence is certainly consistent with assumed above in the anthropometric Mincer's framework, where taller workers are going to decide for those jobs with greater cognitive ability rather than those who has taken a more physical one. As we can appreciate on Figure 2, the gradient of height premium effect over women's log-wages, inasmuch as we are moving from no skilled to more cognitional intensive sectors, the height gradient have long increased its returns to earnings becoming more steeper. The increasing slope of this line translates the marginal effect of height into greater women's wages returns.

Prior has the subjacent implication that taller workers sort into occupations that place a premium on the skills highly correlated with height, it is easy to see on the increasing returns to earnings since blue collar to more cognitive intensive jobs, just as operative and technician, which agrees to the affirmation of occupations that attract taller workers are those which require greater levels of cognitive skills. Therefore, getting back into equation (8), where the unobserved-ability estimators $\boldsymbol{\theta_j}$, are supposed non-orthogonal with height variables $\boldsymbol{\alpha_h}$ (**talla**), by preserving stronger relation with cognitional ($\boldsymbol{\eta_i^c}$) rather than physical ($\boldsymbol{\eta_i^s}$) ability, so that: $\boldsymbol{\theta_j^c} > \boldsymbol{\theta_j^s}$. Moreover, when we are moving to more cognitional intensive job's skills $\boldsymbol{j}$ the difference becomes greater, by suiting with the height cognitive-ability assumed relation instead a physical-ability one. Supporting founded evidence in Case and Paxson (2006, [5]), the height importance on managers and supervisors, via height dummy (**uppermed**), is consistent as well with Persico, Postlewaite and Silverman (2004, [24]) affirmation, they said that taller persons are abler to be better leaders.

Yet obesity condition was significantly found through previous Probit model, on behalf of waist circumference variable, in the earning equation it has not significantly gotten effect on log quasi-wage, discarding neither obesity discriminational nor obesity ability responses to quasi-wage productivity which in terms of (8) that is: $\boldsymbol{\delta} = 0$ implying that to explain women's earnings, unobserved obesity ability are orthogonal to BMI-WC variables. Notwithstanding, waist circumference have clearly accounted for significative effect on labor market inclusion (in prior Probit Model);consequently, at least a yellow light ought to be spotlighted to our society.

Heckman's two-step method estimates in the first step the nonselection hazard or the inverse Mill's ratio, which is incorporated as an extra regressor in the model estimated in the second step. As we saw, this lambda variable captures the variation on employment probability among individuals, by avoiding the bias that self-selection behavior can cause on the OLS estimates using data for working individuals alone. Therefore, the significance of the inverse Mill's ratio coefficients, presented on Table 3, for almost all skills category; lambda's coefficients indicate that self-selection is present, its positive value reveals that women with higher chances to be employed, are also those with higher quasi-wages perception. Hence, the sample of observed wages is biased upward compared with what we would have observed if women decided whether to work randomly, just as can be observe in Figure 2 on operative sector: OLS estimation has upwardly sharped slope than Heckit. In spite of that, professional women have reported negative significance on its Mill's regressor, translated into a downward biased coefficient whether the random selection on working decision were presented.

Finally, sample selection is not significantly present upon technician and non skilled working women, indicating non presence of sample selection's bias for these categorical estimations. Hence, anthropometric Heckman's results merely implicate the same results by using OLS on these two skill categories.

7 Conclusion

Alike prior studies established for Argentina, education attained, current attendance and age variables have important significant returns as likelihood of work opening (Probit) as in the earning equations semi-elasticity coefficients (Heckit). Former mentioned shows that household head earner presence variable also has importance as market inclusion determinant factor. Both model have reported significant and negative returns to increasing children's number of every working women. Within the second censured estimation, be an inhabitant of every region excepting Patagonia entails perceive lower wages than Greater Buenos Aires.

We found certain evidence that affirms that obese women earn lesser average wages than those who have BMI lower than 30 u. and waist circumference below 88 cm. Besides latter, in average, taller feminine workers than sample's median gain more, likewise those who have a waist circumference and BMI lower than the sample's mean. Undoubtedly there are anthropometric patterns conditioning the women's labor market behavior.

Obese women also have less probability of being employed, by according with Probit model and its results on Table 2, the estimates showed imply that an Argentine woman who has suffered 1 incremental centimeter of waist circumference, is near 1 percentage points less likely to get a job; getting worse for NEA and Patagonia regions where that probability arise at nearly 2%.

Considering the anthropometrical Heckman earning equation, there are substantial returns to height on the women's labor market in Argentina where insofar an increase in height of one centimeter is associated with earnings premium of approximately 7% for technicians, 4% for operatives, and a significative reduction of 2% for non-skilled workers. More important indeed is the fact that taller women are more commonly related with higher cognitional intensive positions by showing larger coefficient on technicians than those for non-skilled working women.

Ultimately, we can assert that taller women who have selected into jobs that require greater levels of cognitive skills and lower levels of physical skills. Leadership abilities, through managers-supervisors sector, also have positive effect in the height dummy regressor, being this evidence rather consistent with the hypothesis that economic returns to height can be the result of correlations between height, and cognitive ability developed early in life and remaining throughout it.

Having not been found similar evidence on the professional skill, given its inherent relation with cognition capability, we can assert that height-stature inclusion can improve substantially our understanding on how labor market works. Through the obtained gradients, its contribution by grasping the market behavior is clear.

These results suggest several areas for further research, involving us to develop a new wide batteries of policies against malnourishment and obesity-labor discrimination. Regarding evidence from the medical literature which indicates that nutrition in childhood plays an important role in determining both height and cognitive ability, we strongly support future research towards this direction. The importance of develop nutritional policies is quite critical, moreover by considering the developing countries contexts, where the malnourishment is present nowadays. Eventually disposing with nutritional policies interventions on whose application pledges some level of quality intake, at the same time, is going to facilitate the achievement of an improved food consumption culture by means of a nutritional education's policies for those anthropometrically deprived families. On the one hand, would be reaching an equality of opportunities statement on the intake proportions, and thus to reduce the cognitional gaps by assuring as we can these differences would merely be caused to genetic factors. On the other hand, would be assured ourselves future by guaranteeing the biological prop of our future dreamers: the cognitional capabilities of our children.

Abridging all we can summarize the insight of the paper as follow:

(i) Include height along with other anthropometric data can help us improve our Mincer's regressions estimations.

(ii) Be concerned about what obesity condition involve around labor market, and its implications in equality of opportunity terms.

(iii) Strives further research steering to generate consciousness and better policies against malnourishment and obesity selection through biometric data inclusion.

Inside a word where the social differences are more and more larger each and every moment, all effort aimed to understand the labor market's true nature, can be helpful by encouraging better policy designing to fight poverty, and malnourishment threats. Improving the capability of understanding the women's labor market, is quite critical to figure out the socials vectors of women's behavior by regarding our entangle into a more and more unequal social reality. Currently, albeit mainly the future role of women in the century, will have been a crucial role to cope with two perilous threats: more poorer and unequal societies.

Finally, by reminding thoughts of a worldwide renowned statesman, who wondering around feminine essence, and treating, possibly with the same spirit, to grasp the meaning of their inherent nature once said:

> *"Women have more strengths in their looks than we have in our laws, and more power in their tears than we have by our arguments."*
>
> G. Saville

Could be that Saville was right, but as social researchers, with strong determination is the further aim of this research, and our duty with ourselves, not have allowed nor permitted that the others sorrowful tears being fallen over neither one woman: the tears of discrimination.

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APPENDIX

Figure 1:
Waist Circumference Effect on Working Probability

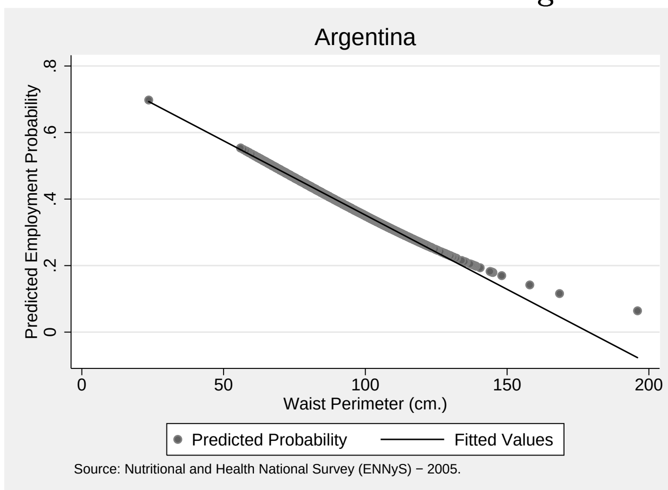

Figure 2:
Height Effect on Women's Earning Gradients

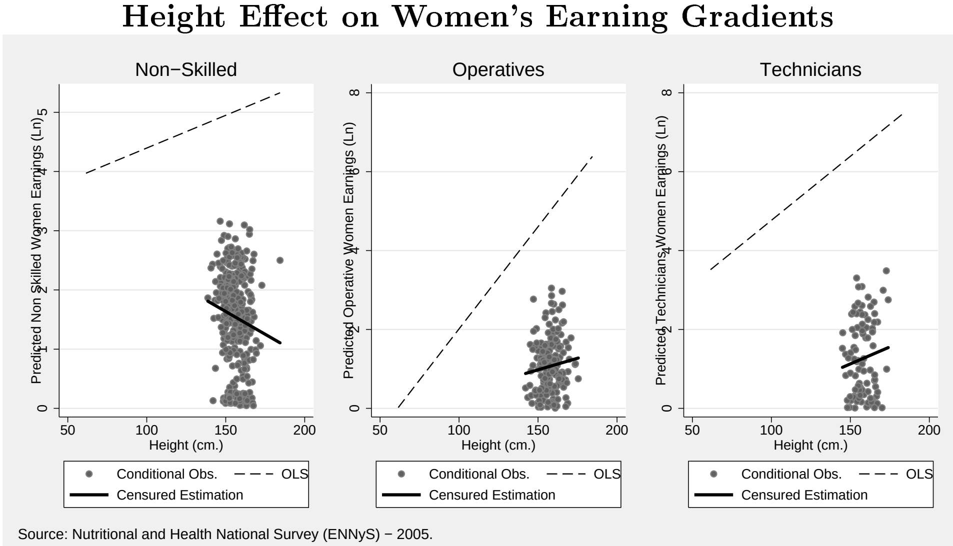

Table 1: **Basic Statistic (Means)**

Cluster	q-wages∗	Height	WC	BMI	n
Education					
Primary	272.12	155.62	88.63	27.45	1207
Secondary	439.96	157.74	85.21	25.75	1472
Coll-Univ	814.57	159.60	82.51	24.86	966
Observed	827	3645	3645	3645	3645
Age Group					
16-19	269.32	158.66	76.11	22.23	771
20-29	478.89	158.35	80.52	23.93	1641
30-39	579.94	157.99	85.44	25.97	1328
40-49	578.37	157.20	90.38	28.14	1166
Observed	1016	4906	4906	4906	4906
Skill Sectors					
Blue Collar	303.47	157.01	85.24	26.03	1129
Operative	624.67	158.21	84.31	25.63	702
Technician	759.58	159.62	82.94	24.94	447
Profess	1054.08	160.35	80.48	24.22	141
Superv	920.48	158.77	80.38	23.93	46
Manag	773.05	157.73	84.76	26.33	76
Observed	1013 †	2538	2538	2538	2538††
Anthropometric Measures					
Height					
$h \geq med$	630.08	-	83.22	25.95	2403
$h < med$	430.96	-	83.82	24.52	2503
Observ.	1016	4906	4906	4906	4906
WC					
$wc < 88cm.$	556.31	158.16	-	22.46	3390
$wc \geq 88cm.$	463.99	157.73	-	31.48	1516
Observed	1016	4906	4906	4906	4906
BMI					
$bmi < 30$	548.23	158.38	79.19	-	4025
$bmi \geq 30$	432.34	156.33	104.32	-	881
Observed	1016	4906	4906	4906	4906
Total Observations	1016	4906	4906	4906	4906

∗ Only those women who work, and not have perceived contributions from a male head household.
† 3 of them declared be active although affirm not work in some specifically work type.
‡ From 2542 women whom reported work, 4 not declared known their job class.
Source: Author's calculation based on ENNyS, 2005.

Table 2: **Anthropometric Probit**

Regressors	**Arg.**	**GBA**	**Cuyo**	**NEA**	**NOA**	**Pamp**	**Pata**
edupc	-0.004	-0.518	-0.241	0.064	-0.392	0.347	0.033
	(0.04)	(1.49)	(0.92)	(0.36)	(1.62)	(1.46)	(0.15)
eduseci	0.092	-0.336	-0.119	0.591	-0.489	0.133	0.089
	(0.94)	(0.90)	(0.45)	(2.78)***	(1.89)*	(0.52)	(0.39)
edusecc	0.223	-0.233	-0.123	0.337	-0.171	0.563	0.292
	(2.24)**	(0.65)	(0.46)	(1.57)	(0.65)	(2.13)**	(1.23)
edusupi	0.238	-0.331	0.190	-0.018	-0.115	0.667	0.219
	(1.88)*	(0.80)	(0.58)	(0.06)	(0.39)	(1.91)*	(0.70)
edusupc	0.909	-0.365	0.993	1.331	0.517	1.381	1.122
	(7.96)***	(0.95)	(3.15)***	(4.67)***	(1.76)*	(4.82)***	(3.91)***
edad	0.172	0.247	0.116	0.186	0.218	0.257	0.074
	(6.13)***	(2.80)***	(1.57)	(3.00)***	(3.10)***	(3.44)***	(1.11)
edadsq	-0.002	-0.003	-0.001	-0.002	-0.002	-0.003	-0.001
	(5.08)***	(2.43)**	(1.29)	(2.39)**	(2.54)**	(2.97)***	(0.75)
asistees	0.332	-0.002	0.074	0.784	-0.009	0.329	0.210
	(2.52)**	(0.00)	(0.22)	(2.29)**	(0.03)	(1.00)	(0.68)
cant hij	-0.119	-0.189	-0.044	-0.142	-0.158	-0.148	-0.120
	(5.24)***	(2.34)**	(0.68)	(3.09)***	(2.91)***	(2.36)**	(2.07)**
fam num	0.033	0.050	0.015	0.056	0.016	0.039	0.105
	(1.89)*	(0.91)	(0.28)	(1.50)	(0.42)	(0.79)	(2.16)**
conviv	-0.063	0.279	0.006	-0.167	0.110	-0.398	0.257
	(0.73)	(0.92)	(0.03)	(0.93)	(0.50)	(1.94)*	(1.11)
jtrab	0.283	-0.043	0.206	0.378	0.243	0.350	0.208
	(3.43)***	(0.14)	(0.97)	(2.13)**	(1.25)	(1.61)	(0.94)
prop viv	0.125	0.142	0.377	0.157	0.469	-0.366	0.165
	(2.25)**	(0.88)	(2.84)***	(1.13)	(3.25)***	(2.58)***	(1.21)
talla	-0.000	0.010	-0.032	0.028	0.005	0.000	-0.012
	(0.04)	(0.50)	(1.67)*	(1.57)	(0.29)	(0.01)	(0.72)
perime	-0.012	-0.000	-0.012	-0.028	-0.000	-0.004	-0.021
	(2.43)**	(0.03)	(0.89)	(2.04)**	(0.03)	(0.35)	(1.93)*
imc	0.017	-0.008	0.013	0.072	-0.036	0.023	0.009
	(1.49)	(0.24)	(0.51)	(2.32)**	(1.25)	(0.82)	(0.36)
uppermed	-0.009	-0.031	0.269	-0.305	0.047	-0.150	0.123
	(0.11)	(0.13)	(1.25)	(1.41)	(0.22)	(0.70)	(0.61)
perob	0.103	0.014	0.348	0.187	-0.024	0.038	0.128
	(1.14)	(0.06)	(1.50)	(0.79)	(0.10)	(0.17)	(0.62)
imcob	-0.078	-0.140	-0.362	-0.370	0.571	-0.320	0.132
	(0.75)	(0.43)	(1.47)	(1.43)	(2.18)**	(1.21)	(0.55)
cuyo	-0.046						
	(0.48)						
nea	0.051						
	(0.52)						
noa	0.065						
	(0.66)						
pamp	-0.012						
	(0.12)						
pata	0.023						
	(0.24)						
Constant	-3.206	-5.680	2.640	-8.057	-4.432	-5.207	0.707
	(2.65)***	(1.74)*	(0.84)	(2.74)***	(1.41)	(1.69)*	(0.25)
Observ	2610	319	451	481	436	428	502
Log-Lik	-1633.221	-203.827	-278.576	-277.302	-259.357		
Pseudo R^2	0.100	0.077	0.108	0.163	0.142	0.167	0.107

Absolute value of z statistics in parentheses:

*** significant at 1%, ** significant at 5%, * significant at 10%

Source: Author's estimation based on ENNyS, 2005.

Table 3: **Anthropometric Heckit**

Regressor	All	Ncal	Oper	Tech	Prof	Sup-Man
edupc	-0.022	0.527	-0.575	0.459		0.010
	(0.161)	(3.169)***	(1.418)	(0.248)		(0.068)
eduseci	0.126	0.523	0.359	-1.112		0.204
	(0.908)	(3.026)***	(0.940)	(0.798)		(1.417)
edusecc	0.343	0.686	0.665	-1.604	-0.435	0.467
	(2.373)**	(3.440)***	(1.735)*	(1.175)	(0.698)	(3.120)***
edusupi	0.526	0.827	0.696	-1.756		0.517
	(2.930)***	(3.156)***	(1.657)*	(1.299)		(2.786)***
edusupc	0.827	-0.098	0.850	-1.105	-0.089	0.853
	(5.657)***	(0.233)	(2.049)**	(0.849)	(0.222)	(5.585)***
edad	0.155	0.076	0.112	0.127	-0.341	0.132
	(3.433)***	(1.355)	(1.450)	(0.562)	(0.638)	(2.827)***
edadsq	-0.002	-0.001	-0.001	-0.002	0.004	-0.002
	(3.034)***	(1.210)	(1.023)	(0.635)	(0.541)	(2.476)**
asistees	0.291	0.598	0.485	-0.730	-0.112	0.283
	(2.953)***	(2.374)**	(1.155)	(0.562)	(0.907)	(2.797)***
cant hij	-0.114	-0.045	-0.221	-0.128	-0.115	-0.114
	(4.208)***	(1.457)	(3.818)***	(0.927)	(0.682)	(4.050)***
talla	0.005	-0.023	0.040	0.070	-0.039	0.006
	(0.493)	(1.711)*	(2.056)**	(1.985)**	(0.757)	(0.554)
perime	-0.005	-0.005	-0.013	-0.015	0.018	-0.004
	(0.742)	(0.763)	(0.899)	(0.587)	(0.676)	(0.716)
imc	0.015	0.021	0.036	0.014	-0.157	0.017
	(1.098)	(1.138)	(1.273)	(0.369)	(2.746)***	(1.215)
uppermed	0.331	0.513	-0.079	-0.315	0.559	0.295
	(2.476)**	(2.897)***	(0.346)	(0.705)	(0.939)	(2.123)**
perob	-0.058	-0.002	0.021	0.261	1.579	-0.092
	(0.445)	(0.012)	(0.084)	(0.535)	(1.746)*	(0.683)
imcob	-0.136	-0.299	-0.277	0.356	0.299	-0.158
	(0.869)	(1.476)	(0.934)	(0.686)	(0.208)	(0.967)
cuyo	-0.576					
	(3.921)***					
nea	-0.645					
	(4.595)***					
noa	-0.529					
	(3.995)***					
pamp	-0.649					
	(4.210)***					
pata	-0.113					
	(0.803)					
Constant	1.930	6.678	-3.210	-4.500	23.979	1.758
	(1.072)	(2.899)***	(0.997)	(0.645)	(1.694)*	(0.943)
Mill's inv	0.282	0.187	0.362	-0.065	-0.798	0.214
(λ_i)	(3.579)***	(1.564)	(1.979)**	(0.187)	(2.373)**	(2.596)***
Total Obs. 3214	3214	3214	3214	3214	3214	3214
Censored Obs.	2542	2876	3021	3118	3191	2562
Uncensored Obs.	672	338	193	96	23	652
Wald Chi	338.740	152.678	124.066	142.607	40.590	255.445

*** significant at 1%,** significant at 5%, * significant at 10%

Source: Author's estimation based on ENNyS, 2005.