# On the Endogeneity of Self-Declared Skin Color in Contemporary Brazil*

Stéphanie Cassilde**
CERDI-CNRS, University of Auvergne, and Marc Bloch University - Strasbourg

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Abstract :

Self-declared skin color in Brazil is often taken in econometric applications as being exogenous, even though a considerable body of research in the other social sciences has underscored its endogeneity. As such, econometric conclusions concerning discrimination in terms of labor market access or wages may be biased. The standard econometric response is, of course, to resort to an instrumental variables procedure in order to correct these biases.

Heretofore, the endogeneity of skin color has never been adequately addressed in econometric terms, because admissible instrumental variables have not been available. This paper focuses on self-declared skin color and uses primary data that was specifically collected in order to implement a first-stage reduced form equation for self-declared skin color. I resort to a chromatic analysis to construct an objective measure of each individual's skin color, later called chromatic constraint, provides good instrumental variables, and the results highlight the links between self-declared skin color and individual characteristics such as occupational, educational and socio-economic status.

Keywords: self-declared skin color, chromatic analysis, Brazil, endogeneity, labor market.
JEL classification: J15, J24, Z13

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** S. Cassilde, CERDI, 65 boulevard François Mitterrand, 63000 Clermont-Ferrand, France. Email: stcassilde@hotmail.fr – tel: +33 4 73 17 74 00 – fax: + 33 4 73 17 74 28.

## Introduction

Self-declared skin color in Brazil is often taken in econometric applications as being exogenous, even though a considerable body of research in the other social sciences has underscored its endogeneity[1]. When one declares their skin color, it can depend on occupation[2], income or wages[3], educational level[4], and the region where one lives[5]. As such, econometric conclusions, whatever the subject – discrimination or inequalities in terms of access to the labor market or wages – may be biased.

The standard econometric response is, of course, to resort to an instrumental variables procedure in order to correct these biases. Heretofore, the endogeneity of skin color has never been adequately addressed in econometric terms, because admissible instrumental variables have not been available. This paper focuses on the first-stage reduced form equation for self-declared skin color. The aim is, first, to assess which variables are determinants of self-declared skin color and then to identify among these *a priori* admissible instrumental variables. Given the nature of the self-declared skin color variable – categorical and unordered – I use multinomial logit estimates, and then multinomial probit estimates when IIA – independence of irrelevant alternatives – is not respected.

To implement this analysis, I use primary data that were specifically collected during my nine-month field research in São Paulo city, in the quality department of an industrial firm: 123 observations are available. Interviews were also conducted in order to get more precise explanations about the endogeneity mechanism(s) of self-declared skin color. The use of chromatic analysis, which enables me to construct an objective measure of each individual's skin color, later called chromatic constraint. This variable appears to provide good instrumental variables, and the results highlight the links between self-declared skin color and individual characteristics such as occupational, educational and socio-economic status.

A first section highlights the background of the endogeneity of self-declared skin color. The second section presents the motivating theory. The estimation framework is exposed in the third section. The data collected on the field are presented in section four. In section five I present the main results, and then I conclude.

## I. Background

Several researches about Brazil use a skin color variable because it is considered a structural dimension in order to analyze and to understand the economical and social phenomena in this country. It is therefore necessary to investigate the content of such variable, in other words the

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[1] Cf. Marvin D. Harris' concept of "cálculo racial" i.e. racial calculus (1964: 23), Carlos Hasenbalg (1979: 68), Carlos Hasenbalg, Márcia Lima, and Nelson do Valle Silva (1999), Edith Piza and Flúvia Rosemberg (2003: 115), José Alberto Magno de Carvalho and Charles H. Wood (2004). As Jacques d'Adesky (2001: 16) underlined it, the Brazilian context differs profoundly from the one of the United States where the one drop rule gives the racial identification: having a single black ancestor implicates the identification of the respondent as black. In Brazil, as Oracy Nogueira (1998: 243-244) underlined it when he presented his famous distinction between "preconceito de marca" (identification mark prejudice) and "preconceito de origem" (origin prejudice), appearance predominates.

[2] Harris (1964: 24).

[3] Lívio Sansone (1993: 86).

[4] Hasenbalg, Lima, and Silva (1999: 115, 120-122).

[5] Michael Hanchard (1999: 10).

way it is collected. The presentation of stakes and implications of the choice of self-declaration or of declaration by others allows me to explain why I focused on the first one in this article. Then I will introduce the different sources of endogeneity, such as they are usually underlined in academic literature.

### *1.1. Skin Color: Self-Declared versus Declared by Others*

Choosing to collect a skin color variable through a self-declaration or a declaration by others covers conceptual stakes. Indeed, an implicit hypothesis is made on the main mechanism by which discrimination is implemented. In the case of a declaration by others, it is assumed that this mechanism is in most cases the consequence of having being sanctioned and hence discriminated by someone else. In the case of self-declaration, it is contrariwise assumed to be, in most cases, the result of self-limitation on behalf of the individuals[6], who have internalized beforehand a context of discrimination and do not like to suffer failure, foreseeable in such a context (they do not want to run the risk of being the victims of discrimination)[7].

For PED surveys [*Pesquisa Emprego Desemprego* – Survey about Employment and Unemployment], the DIEESE [*Departamento Intersindical de Estatísticas e Estudos Socioeconômicos* – Interunion Department of Statistics and Socio-economical Studies] and SEADE foundation [*Sistema Estadual de Análise de Dados* – State System of Data Analysis], the main objective of which is the study of labor market issues, chose declaration by others. It allows to base studies on the point of view of the employer who makes the decision to hire and determines the wages[8]. However, such an approach is restricted when a research is focused on the human capital for instance, where it is more appropriate to use self-declaration. Indeed, trade-off in terms of level of education for example is strictly individual; after the abolition of slavery in 1888, the Brazilian legal system has never included segregationist clauses as it was the case in the United States or in South Africa. Therefore, the IBGE [*Instituto Brasileiro de Geografia e Estatísticas* – Brazilian Institute of Geography and Statistics] chose self-declaration for all its surveys and census, because, as José Luis Petruccelli (2006: 10) underlined it, the only one who has a complete vision of the context of declaration (origin, individual characteristics, etc.) is the surveyed person.[9]

Besides, to cover an implicit hypothesis on the main mechanism which implements discrimination, collecting a skin color variable through self-declaration or declaration by others leads to differences in terms of statistical results[10]. These differences can show more inequalities either when declaration by others is used[11] or when self-declaration is used[12]. But whatever the extent of these differences, the order between the skin colors is always the same: “black”, “brown”, and “white”.

[6] Stéphanie Cassilde (2005).
[7] These two mechanisms coexist.
[8] Lim, and Telles (1998: 456).
[9] Cf. Tereza Regueira (2004) for a detailed presentation of methodologies used in various surveys to collect this variable.
[10] Hasenbalg, Lima, and Silva (1999: 123), Piza, and Rosemberg (2003: 104-105). Piza and Rosemberg (2003) underline that a more refine study about how self-declaration and declaration by others are related misses.
[11] Nelson Lim, and Edward Telles (1998).
[12] Hasenbalg, Lima, and Silva (1999: 123).

The debate could be settled if a measure was assessed as being more objective than the other, but it is not case because both declarations result from individual trade-offs, and both are endogenous[13]. A beforehand exploited idea was to collect both declarations within the same survey, but there is only one such a survey[14]. Therefore, a choice has to be made between these two types of declaration.

I choose to focus on self-declaration rather than on declaration by others for two reasons. The first one concerns the statistical availability of the data generally used for researches on Brazil. The second one concerns potential biases during the collection of data. Indeed, the data of the IBGE, in other words those that are based on self-declaration, are used in the majority of researches, because they are the most available[15]. On the other hand, the endogenous character of the declaration by others has special features which are difficult to grasp because specific data are not available[16]. A complementary stage is in process to improve my data on this point. I underline that the choice of self-declaration is not to be considered in the underlying conceptual debate framework.

### *1.2. Sources of Self-Declared Skin Color Endogeneity*

Self-declared skin color declaration can differ according to the proposed classification, which introduces more or less alternatives. The respondent makes a trade-off taking into account its own economic and social characteristics as well as the context in which he/she answers. This context can be characterized by the presence of another person during the declaration.

The first source of endogeneity echoes the hypothesis of the independence of irrelevant alternatives (IIA). In the Brazilian context, the violation of IIA can arise in two ways: (i) in a traditional way when a term is proposed or omitted in the choice set, and / or (ii) by the substitution of a term by one that does not have the same semantic content. To illustrate the first case, I take the example of two sets A and B composed respectively of two and three alternatives: A = {black; white} and B = {black; white; brown}. Faced with set A, the individuals who would choose alternative "brown" in set B are forced to choose "black" or "white", and this choice would not be maintained if the alternative "brown" was reintroduced. To illustrate the second case, I take the example of the debate comparing the two terms *parda* and *morena*. Choosing *parda* or *morena* leads to highly different statistical distributions of self-declared skin color[17]. The first term, which is within the IBGE classification, is highly

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[13] Various authors show an influence of the interviewer's characteristics on his/her declaration, given his/her own characteristics (Moema de Poli T. Pacheco (1987) quoted by Piza and Rosemberg (2003), Lim, and Telles (1998), Piza, and Rosemberg (2003:104-105)). Gérman W. Rama (1989), quoted by Piza and Rosemberf (2003) underlines the effect of the interviewer's age. Eduardo de Oliveira e Oliveira (1994), cited by Piza and Rosemberg (2003), shows that the interviewer has an inclination in favor of his/her own skin color when he/she does the declaration, following a darkening shift when he/she is closer to "black" and conversely. Moreover, the limit between "white" and "nonwhite" categories differs depending on the interviewer's skin color (Nogueira (1998)). Each time, the interviewer also takes into account the surveyed person's characteristics (Pacheco (1987) quoted by Piza and Rosemberg (2003)).

[14] Lim, and Telles (1998: 467). This survey was conducted by Datafolha in 1995.

[15] This is still the case, despite the circulation in November 2007 during the Xth ABET Meeting [*Associação Brasileira de Estudos do Trabalho* – Brazilian Association about Labour Studies] of PED microdata, that were not available before except for studies performed within partner institutions.

[16] Interviewers' identifiers are not available in PED circulated data, and the interviewers' characteristics are not collected.

[17] Hasenbalg, Lima, and Silva (1999).

criticized. Its detractors underline the imprecision of the *parda* category content[18]. They would like to substitute *parda* for *morena*, which reflects another dimension of Brazilian race relations, i.e. the racial democracy[19]. But given that “morena” is also proved to be an ambiguous category[20], which reflects more an appearance[21] than a demographic information[22], the term *parda* is maintained. One has to consider that when the respondent is faced with infinity of choices (following an open question), the hypothesis of IIA is respected by definition given that the classification is not proposed *ex-ante* but constructed *ex-post*.

The second source of endogeneity is constituted by the individual characteristics of the surveyed person. Several authors[23] underlined that the socioeconomic status can, in a subjective manner, whiten (better status) or darken (conversely) the self-declared skin color. The same is true for other characteristics such as the level of education[24], region[25], age[26] and gender[27].

Interaction, for instance with the interviewer, during the declaration is the third source of endogeneity[28]. Self-declaration is influenced for two reasons: because the respondent positions himself/herself in a relative way toward the interviewer and because he/she is confronted by the perception he/she thinks the interviewer has of the skin color to be declared. It does not mean that the skin color really declared by the respondent in this context matches the one the interviewer would have chosen for him.

During the collection of the skin color variable, the researcher has to make two choices influencing the content of this variable: he/she has to choose who must declare the skin color (self-declaration or declaration by others), and how many alternatives the classification has to offer. For his/her part, the respondent accomplishes a trade-off on the basis of their individual characteristics, which leads to favor one alternative or another within the proposed classification. This trade-off is also influenced by interactions with someone at the time of the declaration. Given these elements, self-declared skin color may be *a priori* considered as endogenous.

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[18] Datafolha (1995).
[19] Gilberto Freyre (1971: 120) cited by Hasenbalg, Lima, and Silva (1999: 87-89), Piza, and Rosemberg (2003: 107).
[20] For Telles (1995: 1609-10), the content of the *morena* category content depends on the region and overlaps almost the whole skin color *continuum*.
[21] A morena person can be light-skinned with brown hair as well as tanned with smooth hair.
[22] Telles (1995: 1610), Hasenbalg, Lima, and Silva (1999: 88).
[23] Cf. Charles Wagley’s social race concept (1965). Hasenbalg, Lima, and Silva (1999: 116) underline a social and economical status homogeneity within each skin color category. Adesky (2001: 95) underlines a whitening effect of high purchasing power.
[24] Hasenbalg, Lima, and Silva (1999: 115, 120-122). Moreover, Adesky (2001: 95) underlines a whitening effect of diploma on skin color declaration.
[25] Hanchard (1999: 10) underlines that a person categorized as “brown” in a given region can be classified as “white” in another one, and conversely. For Piza and Rosember (2003: 92) the region is the third most important skin color determinant after the appearance of the skin and hair.
[26] Piza, and Rosemberg (2003: 115).
[27] Nogueira (1998: 201) underlines that whitening is easier for men than for women, while common sense assumes it would be easier for women given the possibilities of hair modifications.
[28] Hasenbalg, Lima, and Silva (1999: 115), Martine Droulers (2001).

## II. Motivating Theory

Considering self-declared skin color to be endogenous means that the respondent moves away from an implicit color, which I qualify as chromatic constraint. Searching the determinants of self-declared skin color therefore means identifying the variables which motivate such a mobility, whatever its range – respondents moving away more or less from their chromatic constraint – and its direction – clarification or darkening. I first introduce different theories that can explain the links between these determinants and the nature of mobility (defined by its range and its direction), and then I present the theoretical models I will implement.

### *2.1. Defining Chromatic Mobility*

I first assume a *continuum* of skin color – representative of the Brazilian miscegenation – polarized by the colors "black" and "white". The more an individual is well endowed (high education, high wages), the closer his/her self-declared skin color is to "white", the valued color. Conversely, poor endowments (a low education level and low wages) lead to a self-declared skin color closer to "black", the unvalued color.[29] In other words, within this framework, the trade-off leading to a chromatic mobility transcribes a racist[30] value system where being white is synonymous with superiority, and conversely for the term "black". This link is enunciated through the Brazilian saying "*o dinheiro embraquece*", that is to say "money whitens"[31].

If an individual makes a chromatic mobility through his/her declaration, it is by comparison with a standard. It is tempting to name it objective color or true color. However, such a color does not exist[32], because self-declared skin color is a social, cultural and political construction. However, this reference is always implicitly present because mobility is defined by comparison with it. This color of reference is necessary to my analysis. I will later call it chromatic constraint[33] because it determines the range of chromatic mobility. The closer to extremes (black or white) the chromatic constraint is the more reduced is the possible mobility. On the other hand, the more it moves away from these extremes – i.e. depending on the importance of miscegenation – the larger the possible mobility.

However, even if the chromatic constraint defines a space of mobility (both clarification and darkening are allowed), individuals can choose to use it in an asymmetric way. During an interview, a respondent asserted:

> "**Interviewer** – Você acha fácil responder quando uma pessoa pergunta a sua cor da pele? Como você se sente em responder?
> **Respondent** – Ah, eu fico meio em dúvida, entendeu? Por causa ... que eu sou moreno mesmo, entendeu? Mas às vezes a pessoa quer saber [*silêncio*] para ver se há racismo, entendeu? […] Às vezes a pessoa faz a pergunta querendo saber se há o

[29] Endowment allows to attenuate a dark skin color, and conversely. Individual characteristics modify the appearance. Cf. Nogueira (1998: 200, 204).
[30] In Pierre-André Taguieff's meaning (1988). Cf. Maria Aparecida Silva Bento and Iray Carone (2003: 14-17), and Maria Aparecida Silva Bento (2003: 52) for a presentation of whitening mechanisms which articulate whitening ideology and the interiorization of a negative identity.
[31] Another wording of that saying is: "*negro rico é branco, branco pobre é negro*" i.e. "rich black is white, poor white is black".
[32] Osório (2003).
[33] Nogueira (1998: 147) spoke about "senso do ridículo" (sense of the ridiculous).

> racismo entre o negro e o branco.[…] A pessoa não vai chegar para você e vai perguntar: você é racista? […] Ele vai chegar pra você e perguntar 'que cor é essa sua pele?' Entendeu? E você vai falar 'ah, sou branco', só que ela está vendo que não sou, que o meu braço aqui é mais preto por causa do sol, aqui ele é mais branco entendeu? […] Eles vão deduzir que é uma discriminação […]
> **Interviewer** – Se você responde, por exemplo, negro, o que eles vão achar?
> **Respondent** – […] Eles não vão nem notar."[34]

In other words, within this framework, trade-offs lead to a chromatic mobility that is implemented in an antiracist value[35] system, where, on one hand self-declared skin color has to be darker than the chromatic constraint and, on the other hand where it is possible to declare a much more darker skin color than in the previous mobility range ("Eles não vão nem notar" – "They are not even going to notice it"). In all cases, it is necessary not to declare a color clearer than the chromatic constraint; otherwise the interlocutor will conclude that the respondent is racist. What about this social constraint – appearing as antiracist – when the individual cannot answer anything else but "white"? During interviews, I noted that such an answer – "I am white" – was always accompanied by a justification in terms of origins.

If the existence of a chromatic constraint intuitively defines a mobility range, the social constraint cuts down this possibility. Everything depends on the way the individual interprets the question. Daily interpersonal relationships are relevant to interpret the question as a social constraint. But what happens in the context of a survey? It is worth underlining that respondents are aware of differences between these two contexts. I could assume that the social constraint is not validated in the context of the survey. However, knowing that the focus of the research could be racism – even if it is not expressly mentioned by the researcher –, the respondent adapts himself/herself by taking into account the social constraint instead of the chromatic constraint alone.

### *2.2. Theoretical Model*

#### *2.2.1. Unconstraint Model*

In a situation of interaction with the researcher, a mean-individual *i* answers the question "what is you skin color or race?" choosing $c$ between $[\underline{c};\bar{c}]$ where $\underline{c}$ is the darker color available and $\bar{c}$ the lighter one. The choice of $c$ maximizes his mean-utility in the following unconstraint model:

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[34] "**Interviewer** – Is that easy for you to answer when people ask you what your skin color is? How do you feel like answering?

**Respondent** – Ah, I have doubts, you know. Because ... I am "moreno", you know. But sometimes somebody wants to know [*silence*] to see if there is racism, you know. […] Sometimes somebody asks this question to know if there is racism between "black" and "white". [...] People won't come to you and ask: "are you a racist?" [...] People will come to you and ask: "what is your skin color"? You know. And you will say "ah, I am white", but they are seeing that is not the case, that my arm here is darker because of the sun, and here it is whiter. [...] People will deduce that there is discrimination [...].

**Interviewer** – If you answer "black" for example, what would they think about?

**Respondent** – […] They are not even going to notice it." [Author's translation]

[35] In Taguieff's meaning (1988).

$$\begin{cases} \text{Max } Ú_{ij} = Ú(x_i, c_{ij}) \\ \{c_{ij}\} \end{cases}$$

with *x* being their individual characteristics, *c* the skin color (the attributes of which are noted *c* as well) chosen among *J* alternatives. For each *c*, mean-individual *i* calculates his/her utility. Then he/she chooses the biggest, and calls *c** the *c* attached to that maximal utility. First and second order conditions are respectively defined as follow:

FOC : $\partial Ú(x_i, c_{ij}^*) / \partial c^* = Ú'(x_i, c_{ij}^*) = 0$

and

SOC : $\partial^2 Ú(x_i, c_{ij}^*) / \partial c^{*2} = Ú''(x_i, c_{ij}^*) < 0$

### *2.2.2. Model 1: Under Chromatic Constraint*

A first constraint model (MODEL 1) is defined by the chromatic constraint:

$$\begin{cases} \text{Max } Ú_{ij} = Ú(x_i, c_{ij}) \\ \{c_{ij}\} \\ \text{s.c. } |c_{ij} - \check{c}_{ij}| \leq v_{ij} \end{cases}$$

where the possible chromatic mobility, the difference between self-declared skin color and the chromatic constraint $\check{c}$, is $|c - \check{c}| \leq v$, with $v = f(\check{c})$. The function f define the range of the chromatic mobility, whatever its direction (clearer or darker), given the chromatic constraint. As underlined in the preceding section 2.1., the closer $\check{c}$ is to extremes, the smaller v is, and conversely.

Then I can write:

$\Lambda(\lambda, c, x) = U(x, c) - \lambda(|c - \check{c}| - v) = 0$

and first order condition depends on $(c - \check{c})$ sign.

If $(c - \check{c}) > 0$, then $\partial \Lambda(\lambda, c^*, x) / \partial c^* = U'(x, c^*) - \lambda = 0$ and so the Kuhn and Tucker condition is $\lambda^*(c^* - \check{c} - v) = 0$. The chromatic constraint is saturated if $c^* = \check{c} + v$, i.e. if chromatic mobility occurs. If v = 0, it means that the respondent is located on one of the extremes.

If $(c - \check{c}) > 0$, then $\partial \Lambda(\lambda, c^*, x) / \partial c^* = U'(x, c^*) + \lambda = 0$ and so the Kuhn and Tucker condition is $\lambda^*(\check{c} - c^* - v) = 0$. The chromatic constraint is saturated if $c^* = \check{c} - v$, i.e. if chromatic mobility occurs. As previously, if v = 0, it means that the respondent is located on one of the extremes.

If $(c - \check{c}) = 0$, we face the unconstraint model.

Each time, I suppose that the second order condition is satisfied. So $c_{ij}^* = c_{ij}^* (x_i)$.

Following the existing literature, the signs of dc* / dx given *x* are reported in Table 1.

*2.2.3. Model 2: under Social Constraint*

A second constraint model (MODEL 2) is defined by the social constraint:

$$\begin{cases} \text{Max } \acute{U}_{ij} = \acute{U}(x_i, c_{ij}) \\ \{c_{ij}\} \\ \text{s.c. } c_{ij} \leq \check{c}_i \end{cases}$$

where the chromatic constraint $\check{c}$ is the brightest that the mean-individual can declare, i.e. $c_{ij} \leq \check{c}_i$. The chromatic mobility is unidirectional.

Then I can write:

$$\Lambda(\lambda, c, x) = U(x, c) - \lambda(c - \check{c}) = 0$$

The first order condition is: $\partial \Lambda(\lambda, c^*, x) / \partial c^* = U'(x, c^*) - \lambda = 0$. The social constraint is saturated if $c^* \leq \check{c}$. Whitening is forbidden by social constraint.

Following the existing literature, the signs of $dc^* / dx$ given $x$ are the same as those reported in Table 1.

## III. Estimation Framework

### *3.1. Multinomial Logit*

Given the nature of the explained variable, I choose to use the multinomial logit model, which directly stems from the theoretical model previously set forth[36]. Indeed, self-declared skin color is an unordered categorical variable. It is certainly polarized by the black and white colors, but all other alternatives cannot be classified between these extremes without ambiguity[37]. Moreover, the content of each skin color term and the boundaries between the terms depend on individuals[38] .

The equation to be estimated with the multinomial logit model is:

(1) $C = \alpha + \beta X + e$

where $C$ is the self-declared skin color, $\alpha$ is a constant, $X$ represents individual characteristics, $\beta$ represents $X$ associated coefficients and $e$ is the error term.

Expected coefficients signs of the multinomial logit estimates are presented in Table 2.

[36] George Judge, William Griffiths, Carter Hill, and Tsoung Chao Lee (1980: 594-96).
[37] Hasenbalg, Lima, and Silva (1999: 113).
[38] Hasenbalg, Lima, and Silva (1999: 115).

### *3.2. Independence from Irrelevant Alternatives (IIA) and small number of observations*

As underlined in section 1.2., I can be confronted here with a violation of the IIA hypothesis, which leads to biased multinomial logit estimates. Therefore, I will first test whether that hypothesis is violated or not using Hausman and McFadden (1984). Then, if IIA is not respected, I will estimate the equation (1) with the multinomial probit model. The standard solution to IIA hypothesis violation cannot be used here. Indeed, respondents are not confronted to a nested choice structure. For example, they do not choose between “black” or “white” in the first place then a second term among the “black” or the “white” categories.

The database includes few observations. Enlarging the number of observations is not possible here, and neither is imputation. Moreover, imputation does not respect independence between observations. This is why I should implement a standard bootstrap procedure to correct standard errors. However, given computational difficulties, this was not possible after multinomial probit estimates. Therefore, the bootstrap technique is not used in Tables 9 to 14, and standard errors have to be considered as biased. Small sample literature underlines that this bias is against significativity. Therefore, I will interpret all significant results until a threshold of 10 %.

## IV. Data

### *4.1. The Field Research*

The data come from the first part of a field research survey conducted between November 2006 and February 2007 in São Paulo, Brazil. Questionnaires and interviews were realized in the production quality check department of an industrial firm. Two subcontracting firms work in it, which I will respectively call Green and Blue in reference to the color of the workers’ uniforms. The two firms have the same number of employees and they are organized in the same way: a pyramidal structure of five functions, each linked to a unique hour wage, whatever the education level or the experience within the firm or the function.

Questionnaires were submitted to all workers[39], and individually realized with each respondent, on the workplace, in an isolated room. Some people (23.53 %) refused to answer the questionnaire, reducing the numbers of observations from 170 to 130. Given that these refusals are almost all (80 %) from employees of the Blue firm, this potential selection bias can be captured by a binary firm variable which takes the value of 1 if it is the Blue firm and zero otherwise.

### *4.2. Self-Declared Skin Color*

Three different contents of self-declared skin color variable, later called *C*, are available. Indeed, respondents had to answer three times the question “what is your skin color or race?” from the largest number of alternatives to the smallest. The first time, respondents can answer

[39] Indeed, given that I only had access to that department, composed of 170 workers, I chose to maximised the numbers of observations.

freely. The second time, they face 13 alternatives[40]. The third time, they have to choose among IBGE classification alternatives.

Open classification is offered because it can capture the variety of daily skin color terms, which are much more numerous than IBGE alternatives. Two national surveys (PNAD[41] of 1976 and PME[42] 1998, both organized by the IBGE) listed respectively 136 and 143 spontaneous terms. They were conducted to analyze the consistency between the IBGE classification and daily patterns, because of several criticisms against the limited number of alternatives – five – of that institution. Various authors proved such a consistency, showing a huge overlapping[43]. However, in order to conduct studies focused on social or geographical mobility, it seems that the IBGE classification is not completely relevant[44]. Other authors[45] completely reject this classification because it assumes that the researcher's choice is relevant in analyzing the dimension of skin color in Brazil. The open classification in my data is constituted of 16 terms[46], which are aggregated to facilitate statistical analysis (Annex 1). The distribution of respondents among the open classification is presented in Table 3.

A wide classification is then offered to disaggregate the IBGE classification categories[47] and to add the term *negro*. Indeed, this term has a different semantical content depending on who is speaking. In daily life, *negro* is synonymous with *preto*, which is unused because it is an insult. In statistics, *negro* corresponds to the aggregation of the *preto* and *pardo* categories.[48] Finally, in a political context, *negro* is opposed to *white*.[49] The respondents chose only 9 alternatives among the 13 available. The distribution of respondents among the wide classification is presented in Table 4.

Finally, I proposed the IBGE classification[50], made of the following five alternatives: *branca*, *preta*, *amarela*, *parda*, and *indígena*. It is worth noticing that the content of the *parda* category is an aggregation. Indeed, are classified as *parda* people whose self-declarations are *parda*, *mulata*, *cabocla*, *cafuza*, *mameluca* or *mestiça*[51]. None of the respondents chose the *amarela* category. The distribution of respondents among the IBGE classification is presented in Table 5.

The distributions of all the respondents' declarations confirm that the "brown" category is the largest, representing between 38.84 % and 45.90 % of the respondents (Tables 3, 4, and 5). If

[40] Offered alternatives are : *branca* [white], *preta* [black], *parda* [brown/mixed-race], *amarela* [yellow], *indígena* [Indian], *negra* [black], *mulata* [mulatto], *cafuza* [Afro-Indian mixed-race between], *cabocla* [Euro-Indian mixed-race], *nissei*, *sansei*, *mameluca* [Euro-Indian mixed-race] et *outra* [other]. *Nissei* and *sansei* categories refer to different generations of first Japanese migrants to Brazil.
[41] PNAD is *Pesquisa Nacional por Amostragem de Domicílios* (Federal Household Sample Survey).
[42] PME is Pesquisa Mensal de Emprego (Monthly Employment Survey).
[43] Hasenbalg, and Silva (1988), Osório (2003).
[44] José Luis Petruccelli (2000: 40 ).
[45] Bryan Byrne, Josildeth Gomes Consorte, Marvin Harris, and Joseph Lang (1995: 395).
[46] These terms are: *branca*, *branca morena*, *branca parda*, *branca caucasiana* [Caucasian white], *morena*, *morena clara*, *morena negra*, *morena amarela parda*, *índia morena*, *amarela*, *parda*, *parda amarela*, *parda negra*, *negra*, *preta* and *escura preta* [dark black]. The term *morena* is difficult to translate given that it refers to a white-skinned person with brown hair as well as to a tanned person.
[47] The yellow category is divided into *nissei* and *sansei*. The *pardo* category is devided into *mulata*, *cafuza*, *cabocla*, and *mameluca*.
[48] Cf. Yvonne Maggie (1994) for a discussion of *preto* and *negro* significations.
[49] Cf. Adesky (2001), Edward Telles (2004: 85-88), Andreas Hofbauer (2006).
[50] Cf. Telles (2004 : 81-82) for an historical presentation of the IBGE classificaton.
[51] Instituto Brasileiro de Geografia e Estatísticas (2003).

such a category is interpreted as the aggregation of all respondents situated out of extreme color categories ("white" and "black"), it represents between 40.98 % (Table 3) to still 45.90 % (Tables 4 and 5): it is interesting to notice that the aggregation of "brown" and "morena" in the wide classification equals "brown" in the IBGE classification. The second category is "white", the size of which is relatively stable within the classifications (between 32.79 % and 34.43 % - Tables 3, 4, and 5). The third category is "black", the size of which merely depends on the classification: 16.39 % of the respondents declares being "black" in the IBGE classification (Table 5) while they represent 22.13 % in the open classification (Table 3). When there is a distinction between the two "black" terms, *negra* has much more respondents than *preta*. This is related to an implicit meaning: *preta* only refers to a color, while *negra* has a cultural or political dimension, which is more valued. Other categories are marginal.

The distribution of the respondents' skin color doesn't correspond to the global Brazilian pattern. Indeed, "black" respondents are almost twice as numerous in relation to people living in metropolitan regions (9.60 % - Table 5). Conversely, "white" respondents are less numerous (about 23 points of percentage), while the "brown" category is larger (between 5.64 to 12.7 points of percentage). These differences are bigger when the Brazilian pattern is restricted to the São Paulo metropolitan region, where the field research was conducted. Indeed, "white" respondents are almost twice as less numerous (about 33 % while they are 65 % in the whole metropolitan region – Table 5). The differences between the respondents' distribution and the São Paulo metropolitan region distribution can be explained by the context of data collection, characterized by a status of subcontractors[52] in the industrial sector.

### *4.3. Chromatic Constraint*

As underlined before, the chromatic constraint variable is always implicitly present in the whitening and darkening processes. I asked each respondent to allow me to take a numerical picture – a portrait. The idea is to conduct a chromatic analysis on the basis of these pictures to obtain an "objective" skin color[53], in comparison with the subjective dimension of declarations, i.e. being based on the subjectivity of the respondent (self-declaration) or of someone else (declaration by others). The aim is not to see self-declaration as a lie, especially since the respondents are right in terms of economic and social perceptions, but to have exogenous data allowing to merge them on a basis which is free from individual characteristics. To avoid confusion, I shall speak about "hue color". Among the 130 respondents 94.61 % accepted to be photographed: the number of observations is therefore 123.

This hue color must be rigorously collected in order to be useful. Notably, photographs have to be comparable. The context of data collection during the field research was particularly advantageous from this point of view [54]. This numerical photograph is then analyzed through the software "la Boîte à Couleurs"[55], which enables to choose a color on the screen – in this case, on the photograph – and to obtain codes of that color in five different models as well as the corresponding name of this color in seven palettes (RgbColors, Chroma, WebPalette,

[52] For example, workers do not have any social insurance through their job.
[53] I recall that it is a misuse of language because such a color does not exist (Osório, 2003).
[54] The room where questionnaires were realized is hermetic to any natural light (no window); I control artificial light. The distance between the respondent and the camera is the same. The parameters of shot do not change: a speed of 1/25, an opening of 2.8, and no flash.
[55] "The Color Box". I use version 1.6.15.

HtmlColors, LlogColors, Pantone, and Ral-Classic). There is no mechanical link between these palettes, i.e. they are independent. The chromatic analysis of the respondents' photographs[56] gives respectively among these palettes 7, 10, 3, 6, 9, 9 and 8 different colors, classified according to their degree of brightness[57], from the lowest to the highest (Table 6). For a descriptive purpose, this variable is constructed in a categorical way: Table 6 presents these colors. In estimates, this variable will be used as a continuous variable given the degree of brightness. Figure 1 shows respondents distribution among these. Indeed the total number of explanatory variables has to be restricted given the weak number of observations.

Table 6 shows that a same set of photographs matches different sets of colors. I notice a variability both in terms of the number of colors – from 3 in WebPalette palette to 10 in Chroma palette - and in terms of the extent of brightness – from 46 in Chroma palette to 148 in HtmlColors palette. Moreover, each palette has a more or less important intra-variability: it is maximum within the Chroma palette (an extent of 92 points of brightness), and minimal within the WebPalette palette (an extent of 25 points of brightness). Figure 1 underlines that the hue color variables have very different densities. Only three of these variables – logc_bright, html_bright, and rgb_bright – have their maximum at the same brightness. Two other variables have a rather flat density (pant_bright and ral_bright). The chromatic analysis through the WebPalette palette segments respondents into two distinct groups: this specific density is the one that differs most from the others.

The expected coefficient sign of hue colors variables depends on the respondent's choice among the alternatives. If the self-declared skin color is closed to "white", the expected coefficient is positive: the brighter the hue color, the more the respondents can choose a "white" skin color. Conversely, if the self-declared skin color is close to "black", the expected coefficient is negative: the brighter the hue color, the less the respondents can choose a "black" skin color. Given the similarities or differences between hue color variables, I expect similar or different results in term of the largeness of coefficients and significativity.

### *4.4. Explanatory Variables*

#### *4.4.1. Individual Characteristics*

Among individual characteristics which influence the self-declaration of one's skin color, I keep education variable, age, gender, occupation and the perceived social class, because they are traditionally considered as appropriate (section 1.2.).

The number of validated year of education (**educ**) is an average of 8.89 years (Table 7). This variable is restricted to secondary school because of the difficulty to quantify the number of years for higher education[58]. Only four (i.e. 3.25 % - Table 7) respondents got a higher education, without however going beyond the bachelor's degree: it is captured by a binary variable (**bachelor**). It is worth underlying that access to university is submitted to a

[56] This analysis is done in four points of the face: the forehead, the nose, the cheeks and the chin. To keep a maximal number of observations, the fourth point is not used. Indeed, there is a selective attrition toward men with beard.

[57] Brightness is deducted from the HLS model (hue, lightness, and saturation). In the field of photograph, a model describes the elements of a colour. In this model, the color "white" has a 100 % of brightness.

[58] The university system is not homogeneous: getting a bachelor's degree requires more or less years depending on the subject.

competitive exam called *vestibular*. Each faculty – within a same university too – offers its own *vestibular*. It is not possible to be accepted in another discipline than the one for which one applies, even if the result is very good. The body of knowledge necessary to have this competitive exam is normally acquired at the end of secondary school. However, a good preparation is given only through private sector schooling, where education is of a better quality (and very costly). Even in that case, some pupils follow a specific preparation that one must pay for. Studying at university is therefore a strong human capital signal. Moreover, few pupils apply to *vestibular*. Indeed, besides a huge preparation investment (of money and time), one has to be able to afford university. Some successful students do not enter the university for financial reasons. Grants are only available to the best. Therefore, taking the *vestibular* (both in public university – **vest_pu** – and in private university – **vest_pr**) gives information about the aspirations of the respondents, about what they think of their own capacities of being successful in such a selective system. Only 7.32 % have the *vestibular* in the public sector, and 9.76 % in the private sector; 4.07 % tried both (Table 7). It is also worth underlying that the Brazilian education system offers various ways of finishing school. Primary and secondary education can be validated by adults that are already integrated on the labor market through the *supletivo* (**supletivo**), which concerns 16.26 % of the respondents (Table 7). However, for the same educational level, the meaning of the signal for the employers will differ: the human capital signal of the *supletivo* diminishes the value of the educational level. No variable concerning the schooling sector is introduced because all the respondents were sent to public schools. The educ variable has a particular feature (Figure 2) because hiring criteria changed. Nowadays, the minimum level required by the employers of both firms is to having completed secondary school, i.e. 11 years of education.

The hierarchical position occupied within the Blue and Green firms is synthesized in one categorical ordered variable (**pyramid**). It takes values between 0 and 4 corresponding respectively to the status of an unskilled paker, an executant, a second-in-command, a skilled paker, and a manager. The first two steps of the pyramid represent respectively 43.90 % and 46.34 % of the respondents –Table 7). They work together (binomial) and do quality verification. Other functions are rather of supervision.

The age at the time of the survey (**age**) as well as a dummy variable for men (**men**) are also introduced into the equation. There is no wage variable because it is collinear with functions. To capture a "wealth" effect, I use the perceived social class (**class**). Through this perception, I expect the respondents to take into account their relative position to others and / or to his/her past state. In this sense, this variable can be interpreted as a social mobility variable.

Finally, a regional dummy variable is introduced for the respondents born in the North East of Brazil (**NE**) where the relative manner to choose a skin color is *a priori* the most distant from the one in São Paulo.

Expected signs of coefficients and justifications of these expectations are presented in Table 2.

#### *4.4.2. Spare Time and Election Choice* Variables

According to Telles (2004), cultural variables are highly correlated with skin color self-declaration. If the respondent likes carnival, a dummy variable **carnival** takes the value of 1, zero otherwise. In the same way, if the respondent likes soccer, a dummy variable **soccer** takes the value of 1, zero otherwise[59].

Other authors underline possible links between the declaration of one's skin color and political choices. Notably, Hasenbalg, Lima and Silva (1999: 42) maintain that a vote in favor of the labor party is highly correlated with the "black" category. Given the proximity of the last presidential elections at the time of the field research – October 2006 – I asked the respondent to reveal for whom he/she had voted. If he/she voted for Luiz Inácio Lula da Silva in the second turn, a dummy variable **Lula** takes the value of 1, zero otherwise.

Table 8 shows descriptive statistics of these variables. Expected signs of coefficients and justifications of these expectations are also presented in Table 2.

#### *4.4.3. Control Variables*

As underlined before – in section 1.2. – the self-declaration of one's skin color can be influenced by the presence and characteristics of a third person. Given that all questionnaires are realized with a single interviewer, one part of this bias is avoided. However, the respondent can react to the interviewer's skin color. An interviewer's hue color variable (**i_bright**) is therefore introduced [60]. Given that there is no variability for two of these hues – in WebPalette and Pantone Palettes – therefore, there are five hue variables.

The room where the questionnaires were conducted is usually used for administrative purposes. A second-in-command was sometimes present during the questionnaire. A dummy variable **third** captures this bias: it takes the value of 1 if a third person is present, zero otherwise.

Finally, a dummy variable for the Blue firm (variable **blue**) is introduced to capture a possible selection bias.

Table 8 shows descriptive statistics of these variables. Attention will be paid to the statistical significativity of these variables rather than to coefficients.

## V. Main Results

### *5.1. The Context of the Estimates*

Multinomial logit estimates are inconsistent given that the Hausman and McFadden (1984) test for independence of irrelevant alternatives (IIA) rejects the null hypothesis[61]. Therefore, the results I will present are based on multinomial probit estimates. Some variables were removed given some difficulties for the estimator to converge. It was impossible to perform estimates, especially, when the explained variable was $C_{open2}$. The implementation of a bootstrap technique failed too, given some computational difficulties. I limit my analysis to coefficients which are significant until 10 %. The base outcome for all estimates is the

[59] This variable does not take value significantly statistically different according to gender.
[60] Photographs of the interviewer are taken in the same conditions as respondents' photographs. They are analyzed in the same way too, as presented before in section 4.3..
[61] Results are not shown.

"white" category, the content of which is the more stable (section 4.2.). The specification numbers correspond to the underlying palette[62].

The significativity of **blue** (Tables 13 and 14) confirms that there is a selection bias. However, concerning the respondents who answered "black", **blue** becomes significant only when **vest_pr** or **vest_porp** are introduced. It is worth underlying that the manager of the Blue firm defines himself as "black" and that he encourages employees to have the *vestibular* and to self-declare "black" in order to benefit from a recent affirmative action. Such an incentive from the Blue firm manager can explain this result.

The control variable **third** is also significant, but only for the respondents who answered "black". The multinomial normal-odds for "black" relative to "white" would be expected to decrease by 2.6906 units at least (Table 13 – specification 3) and by 3.4141 units at most (Table 13 – specification 7). In other words, the presence of a third person influences the respondents in avoiding the "black" category.

In any case, estimates fail to show a significant effect of **i_bright**. Maybe the variability of **i_bright** is not sufficient given that this variable concerns a single interviewer.

Given the context of the estimates, I had to take a lot of precautions when conducting the analysis of Tables 9 and 10. Indeed, the **blue** omission conducts to an uncorrected selection bias. Moreover, the **third** omission gives biased estimates when the outcome category is "black". Tables 11 to 14 can be interpreted with more confidence.

### *5.2. The Chromatic Constraint*

The hue colors are highly significant (Tables 9 to 14). Whatever the outcome, the more I insert variables in the equation, the more the odds – whatever the outcome – would be expected to increase. In other words, it confirms the importance of appearance in defining skin color.

When the respondents face the open classification, the multinomial normal odds evolution for the outcome "black" are at least twice as large as the odds evolution for the outcome "brown" (Table 9). Both have a negative sign: the brighter the hue color, the more categories "black" and "brown" would be avoided. The estimates with the wide classification (Table 10) and with the IBGE classification (Tables 11 to 14) confirm this result It is worth underlying that odds change for the outcome "black" (*negra*) are larger than odds change for the outcome "black" (*preta*) (Table 10). In this context – of a wide classification - it seems that the "black" (*negra*) category has to be interpreted in its political meaning[63], i.e. there would only be two categories ("white" and "black"). The brighter the hue color, the closer the identification is to the "white" category. The estimates with the IBGE classification add results for the "Indian" category: odds for this outcome relative to the "white" category would be expected to decrease by 0.0367 units at least (Table 11 – specification 5) and by 0.2653 at most (Table 14 – specification 7). The size of the coefficients for this outcome is smaller than for other outcomes.

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[62] [1] corresponds to the RgbColors palette; [2] corresponds to the Chroma palette; [3] corresponds to the WebPalette palette; [4] corresponds to the Pantone palette; [5] corresponds to the Ral-Classic palette; [6] corresponds to the HtmlColors palette; and [7] corresponds to the LogColors palette.

[63] Indeed, the "brown" and the "black" (*preta*) categories are offered at the same time.

Some coefficients could be seen as small, but I recall that hue colors can have a large scale (section 4.3.). For example, if a respondent goes from “sienna” to “warmgrey” (Table 6 – RgbColors palette), i.e. from a brightness of 103 units to a brightness of 117, the odds for the outcome “black” relative to the “white” category would be expected to decrease by 2.4038 units (from Table 11 – specification 1).

According to Figure 1, it would be expected to get more similar palettes corresponding to similar results. There is no evidence of such a pattern. Two points are outstanding. The first one is that, whatever the palette, the order between the evolution of odds is maintained, given the outcome. The second one would be that the LogColors palette leads to the highest coefficients.

### *5.3. Education*

For the variable **educ**, there are few significant coefficients. Moreover, the estimates lead to contradictory results. The wide classification estimates present positive coefficients for **educ** (Table 10), while the IBGE classification estimates underline negative coefficients (Tables 11 to 14). The positive sign could be explained comparing the distribution of the respondents self-declared skin colors to the skin color pattern of the metropolitan region of São Paulo (Tables 4 and 5). The respondents who defined themselves as “white” could be less endowed than the statistical expectation given the features of the São Paulo metropolitan region. On the other hand, such a positive sign could be interpreted as a selective hiring process: the respondents who defined themselves as “black” could have been hired because they have a higher educational level than other applicants. Conversely, the negative sign of the **educ** coefficients could be explained by the traditional “money whitens” revisited as “education whitens”. A technical reason pleads in favor of the estimates from the IBGE classification: they are *a priori* more reliable than the estimates from the wide classification because control variables are included.

Tables 13 and 14 present estimates with **vest_pr** and **vest_porp**. They lead to larger and more significant **educ** coefficients. This underlines the importance of the *vestibular*. However, it is often far from estimates in the literature[64]. Moreover, taking into account higher education excludes all students who had (not passed) the *vestibular* and stopped their studies after the exam. However, even if the *vestibular* coefficients are highly significant, the estimates lead to contradictory results, too. Coefficients are negative with **vest_pr** (Table 13), while they are positive with **vest_porp** (Table 14). The signs could be explained as previously. The respondents who defined themselves as “black” had to have a higher educational level than others applicants to be hired (positive sign). Conversely, the respondents who defined themselves as “black” could be less endowed than the other respondents: “little education darkens”. Such a result could be confirmed by the nature of **vest_pr**: in the private sector, students have to pay university, while public university is free of charge. In such a context, the parallel between “education whitens” and “money whitens” is perfect. Conversely, having the public *vestibular* can indicate higher individual capabilities given that the *vestibular* in public universities is the most difficult one – and therefore the most prestigious. At the moment, I cannot trade off between these two interpretations because **vest_pu** cannot be introduced into the estimates. Moreover, all education variables could be endogenous.

[64] Among the exceptions cf. Béatrice d’Hombres (2004).

### *5.4. Occupation*

The estimates from the wide classification show a stable pattern for the "black" (*negra*) and the "black" (*preta*) categories (Table 10). The multinomial normal odds for the outcome "black" (*negra*) relatively to the "white" category would be expected to increase by 0.6751 units at least (Table 10 – specification 1) and by 1.1603 units at most (Table 10 – specification 2), while the expected increase of odds for the outcome "black" (*preta*) would be smaller – by 0.6391 units at least (Table 10 – specification 2) and by 0.6559 units at most (Table 10 – specification 5). In other words, the "black" (*negra*) category is associated to a better occupational status than the "black" (*preta*) category. This corresponds to the different meaning of both terms, where *negra* indicates a stigmata claiming[65] rejecting the term *preta*.

The IBGE classification estimates show another stable pattern (Tables 11 to 14). The multinomial normal odds for the outcome "black" relatively to the "white" category would be expected to increase by 0.5183 units at least (Table 11 – specification 3) and by 2.0385 units at most (Table 13 – specification 3), while the expected increase of odds for the outcome "brown" would be larger – by 0.6784 units at least (Table 13 – specification 3) and by 2.2891 units at most (Table 14 – specification 7). The "brown" category is expected to be associated with a better occupational status than the "black" or the "white" categories.

The results concerning the variable **pyramid** suggest that there is not any congruence between the occupational status within the Blue and Green firms and with the educational level. However, this variable could also be considered endogenous. The instability of the coefficients attached to the outcome "Indian" can be a consequence of such an endogeneity.

### *5.5. Others Individual Characteristics: Age, Gender, Perceived Social Class, and North East Region*

Concerning the age, the older the respondents are, the brighter they define themselves (Tables 11 to 14 show statistically significant negative coefficients). To be more precise, the older the respondents, the more polarized they are. Indeed, the "black" category is associated with smaller coefficients. A first explanation of such a result could be that if the respondents are likely to whiten themselves according to a better social status, becoming older can be mechanically linked to social mobility (buying a house, getting a stabler job, saving money, etc.). Another explanation could be the experience within the firm: the respondents who declared themselves "white" could have a larger probability of staying in the firm, while the respondents who declared another skin color are faced with turn-over.

For the gender variable (**men**) the estimates failed to show an effect. However, it is worth noticing that the coefficients are very large. Appropriate estimation techniques have to be implemented to avoid what could be the consequence of the small number of observations.

Concerning the perceived social class, the estimates are significant only in the second specification. This underlines, again, a possible sensitivity to the palette which is used. However, the odds for the outcomes "black" and "brown" relatively to the "white" category would be expected to increase (Tables 11 to 14). In other words, a better perceived social class is associated to a darker skin color.

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[65] In Erwing Goffman's meaning (1995).

The results linked to the variable **NE** are very intuitive. The open classification estimates underline that the multinomial normal odds for the outcome "yellow" would be expected to highly decrease (Table 9). Observations in the North East region could easily confirm that the population of Asian descendants is very small. Conversely, almost all of the Japanese migrants arrived in São Paulo State. The IBGE classification estimates correspond to the skin color pattern of the North East region: it is more probable to meet a person who would self-classify as "black", then "Indian", and then "brown". It is also worth underlying that the results are statistically significant: this confirms the importance to resort to such a variable in order to capture regional differences.

### *5.6. Spare Time and Election Choices*

The estimates concerning spare time and election choices are reported in Tables 12 to 14. For the variables **carnival** and **soccer**, the estimates failed to show any effect. Concerning the election variable **Lula**, the results correspond to the literature[66]. When a respondent voted for Luiz Inácio Lula da Silva, the odds for the "brown" and then for the "black" categories would be expected to increase. However, the coefficients attached to this variable are not stable.

## Conclusion

This article focused on the endogeneity of self-declared skin color in contemporary Brazil. With a database that was limited to two firms in the industrial sector, the main results show a darkening effect of the variables of social and economical status, i.e. of the occupational status within the firms, and of the perceived social class. It is the contrary of the expected results usually underlined in the literature. This can be related to the data, the pattern of which differs significantly from the features of the metropolitan region of São Paulo, and from the features of the Brazilian population in general.

Other results confirm literature findings. Indeed, the older the respondents are, the whiter they would be expected to declare themselves. Moreover, I notice a polarization effect of age: the multinomial normal odds for the "brown" category are larger than the odds for the "black" category (both are negative). Concerning the political choice, voting in favor of the labor party is highly associated with the "brown" and the "black" categories. This confirms literature conclusions, too.

For some variables, the estimates failed to show any effect. It is the case for: (i) liking carnival, (ii) liking soccer, and (iii) being a man. This can be linked to the small number of observations, which increases standard errors, it was not possible to perform the bootstrap technique for computational reasons. Therefore, I cannot definitely conclude on the links between self-declared skin color and these variables.

I introduced two types of variables to take schooling into account: the educational level in years (limited to secondary school), and the fact of having the *vestibular*, which is a competitive exam enabling to enter university. Both variables have contradictory results: given the introduced control variables, the coefficients are negative or positive. When the

[66] Hasenbalg, Lima, and Silva (1999: 42).

coefficients are negative, it corresponds to the literature findings where “education whitens”. But positive coefficients can also be intuitively explained. Indeed, they can underline that the darker the skin color, the more educated the respondents need to be in order to get the job. I cannot conclude on the direction of the effect of these variables, both because of specification difficulties – all variables were not included in all estimates – and because of a problem of endogeneity.

Finally, hue colors are highly significant and the bigger the brightness, the less the respondents are likely to declare themselves “black” or “brown”. The results correspond to my expectations. However, a deeper analysis of palettes would be informative to judge the robustness of the hue color coefficients.

If the purpose is using hue colors as instrumental variables, the article only introduces a first step. Annex 2 sets forth correlations between hue colors and occupations, and between these colors and the level of education. It seems that hue colors could be good instrumental variables for an educational attainment equation, given that correlations are small. Another point that needs to be developed concerns the theoretical model. No element of the article allows to trade-off between the social constraint and the chromatic constraint. In all case, relevant estimation techniques shall be performed to obtain reliable results.

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## Appendix

### *Table 1: Expected signs of dc* / dx given x*

| x | sign of dc* / dx | Reference |
|---|---|---|
| the clearer the **appearance** of the respondent | > 0 i.e. whitening | Harris (1964: 23), Hasenbalg, Lima, and Silva (1999: 117-124) |
| the higher the **educational level** of the respondent | > 0 i.e. whitening | Hasenbalg, Lima, and Silva (1999: 98-105) |
| the higher the **wage** of the respondent | > 0 i.e. whitening | Hasenbalg, Lima, and Silva (1999: 98-105, 111-112) |
| **wages** | = 0 | Nogueira (1998: 64), Telles (2004) (colinearity with the skin color) |
| the **older** the respondent is | > 0 i.e. whitening | Petruccelli (2000: 24-25) |
| **gender** | = 0 | Petruccelli (2000: 22-23) |
| the higher the **occupation** (in terms of hierarchy) | = 0 | Nogueira (1998: 64) (colinearity with the skin color) |
| the higher the **social class** | = 0 | Nogueira (1998: 64), Telles (2004) (colinearity with the skin color) |
| **region** | $\neq 0$ | Petruccelli (2000: 13) |

Source: Cassilde (2008)

### *Table 2: Expected Signs of Coefficients and Justifications of these Expectations Multinomial Logit/Probit Estimates*

| | outcomes of the IBGE classification | | | outcomes of the open (1) classification | | |
|---|---|---|---|---|---|---|
| | **Black** | **Brown** | **Indian** | **Black** | **Brown** | **Yellow** |
| the clearer the **appearance** of the **respondent** | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta > 0$ |
| | $\beta_{black} < \beta_{brown}$ | | | $\beta_{black} < \beta_{brown} < \beta_{yellow}$ | | |
| the higher the **educational level** of the respondent | $\beta < 0$ | unk. | unk. | $\beta < 0$ | unk. | $\beta > 0$ |
| the respondent have the **vestibular** | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta > 0$ |
| the **older** the respondent is | $\beta < 0$ | $\beta < 0$ | unk. | $\beta < 0$ | $\beta < 0$ | unk. |
| | $\beta_{black} < \beta_{brown}$ | | | $\beta_{black} < \beta_{brown}$ | | |
| **gender*** | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ |
| the higher the **occupation** (in terms of hierarchy) | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* |
| | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta > 0$** |
| the higher the **social class** | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* |
| | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta > 0$** |
| the respondent was born in the **North East region** of Brazil | $\beta > 0$ | $\beta > 0$ | $\beta > 0$ | $\beta > 0$ | $\beta > 0$ | $\beta < 0$ |
| | $\beta_{black} > \beta_{brown}$ | | | $\beta_{black} > \beta_{brown}$ | | |
| the clearer the **appearance** of the **interviewer** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** |
| the respondent works in **Blue firm** | unk. | unk. | unk. | unk. | unk. | unk. |
| a **third person** is present during the questionnaire | unk. | unk. | unk. | unk. | unk. | unk. |
| the respondent likes **carnival****** | $\beta > 0$ | $\beta < 0$ | unk. | $\beta > 0$ | $\beta < 0$ | unk. |
| the respondent likes **soccer** | unk. | unk. | unk. | unk. | unk. | unk. |
| the respondent **voted in Lula** ($2^{nd}$ turn of the presidential elections of 2006) | $\beta > 0$ | $\beta > 0$ | unk. | $\beta > 0$ | $\beta > 0$ | unk. |

Table 2: to be continued...

Table 2: continued

| | outcomes of the wide classification | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Black (*negra*)** | **Black (*preta*)** | **Cabocla** | **Indian** | **Mulatta** | **Brown** | **Yellow** |
| the clearer the **appearance** of the **respondent** | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta > 0$ |
| | $\beta_{black\ (negra\ or\ preta)} < \beta_{brown}$ and $\beta_{black\ (negra\ or\ preta)} < \beta_{mulatta}$ | | | | | | |
| the higher the **educational level** of the respondent | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta > 0$ |
| | $\beta_{black\ (negra\ or\ preta)} < \beta_{brown}$ and $\beta_{black\ (negra\ or\ preta)} < \beta_{mulatta}$ | | | | | | |
| the respondent have the **vestibular** | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta < 0$ | $\beta > 0$ |
| the **older** the respondent is | $\beta < 0$ | $\beta < 0$ | unk. | unk. | unk. | $\beta < 0$ | $\beta > 0$ |
| | $\beta_{black\ (negra\ or\ preta)} < \beta_{brown}$ | | | | | | |
| **gender*** | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ | $\beta = 0$ |
| the higher the **occupation** (in terms of hierarchy) | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* |
| | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta > 0$** |
| the higher the **social class** | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* | $\beta = 0$* |
| | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta < 0$** | $\beta > 0$** |
| the respondent was born in the **North East region** of Brazil | $\beta > 0$ | $\beta > 0$ | $\beta > 0$ | $\beta > 0$ | $\beta > 0$ | $\beta > 0$ | $\beta < 0$ |
| | $\beta_{black\ (negra\ or\ preta)} > \beta_{brown}$ | | | | | | |
| the clearer the **appearance** of the **interviewer** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** | $\beta = 0$*** |
| the respondent works in **Blue firm** | unk. | unk. | unk. | unk. | unk. | unk. | unk. |
| a **third person** is present during the questionnaire | unk. | unk. | unk. | unk. | unk. | unk. | unk. |
| the respondent likes **carnival****** | $\beta > 0$ | $\beta > 0$ | unk. | unk. | unk. | $\beta < 0$ | unk. |
| the respondent likes **soccer** | unk. | unk. | unk. | unk. | unk. | unk. | unk. |
| the respondent **voted in Lula** (2nd turn of the presidential elections of 2006) | $\beta > 0$ | $\beta > 0$ | unk. | unk. | unk. | unk. | unk. |

Source: Cassilde (2008)
unk.: unknowed sign.
*: following the literature.
**: I recall that in my data occupation and wage are completely colinear.
***: because the interviewer is always the same.
****: following the logical which differentiates engroup and exogroup.

### *Table 3: Distribution of Respondents within the Open Classification*

| | **Distribution of Respondents $C_{open1}$** | | **Distribution of Respondents $C_{open2}$** |
|---|---|---|---|
| Black | 22.13 % | Black (*preta*) | 2.46 % |
| Brown | 40.98 % | Black (*negra*) | 18.03 % |
| Yellow | 2.46 % | Brown | 18.85 % |
| White | 34.4 % | Morena | 27.05 % |
| | 100 % | Yellow | 0.82 % |
| | | White | 32.79 % |
| | | | 100 % |

Source: Cassilde's field research data. There are 122 observations, given that a respondent answered "other" which is not kept here.

### *Table 4: Distribution of Respondents within the Wide Classification*

| | Distribution of Respondents $C_{wide}$ |
|---|---|
| **Black (*negra*)** | 14.88 % |
| **Black (*preta*)** | 4.96 % |
| **Cabocla** | 0.83 % |
| **Indian** | 0.83 % |
| **Mulatto** | 3.31 % |
| **Brown** | 38.84 % |
| **Yellow** | 3.31 % |
| **White** | 33.06 % |
| | 100 % |

Source: Cassilde's field research data. There are 121 observations, given that a respondent answered "other" which is not kept here, and another one did not answer.

### *Table 5: Distribution of Respondents within IBGE Classification*

| | Statistical Source $C_{ibge}$ | | |
|---|---|---|---|
| | **Field Research Nov. 2006 to Feb. 2007** | **PME-SPMR Sept. 2006** | **PME-MR Sept. 2006** |
| **Black** | 16.39 % | 33.30 % | 9.60 % |
| **Brown** | 45.90 % | | 33.20 % |
| **Indian** | 3.28 % | unk.* | 0.01 % |
| **White** | 34.43 % | 65.00 % | 56.50 % |
| | 100 % | 98.3 %** | 99.30 %*** |

Source: Cassilde's field research data. There are 122 observations, given that a respondent answered "other" which is not kept here. Work and Income Department of IBGE for PME data which concern respondents that are more than 10 years old (i) in SPMR (São Paulo Metropolitan Region) and (ii) in six MR (Metropolitan Region): São Paulo, Rio de Janeira, Belo Horizonte, Salvador, Recife, and Porto Alegre.

*: Yellow and Indian categories were aggregated.

**: Indian percentage lacks.

***: Yellow percentage lacks.

***Table 6: Hue Colors of Respondents among seven Palettes***

| | Chroma Palette | |
|---|---|---|
| | brightness | number of respondents |
| maduro | 46 | 1 |
| chocolat | 63 | 3 |
| colorado | 67 | 1 |
| colorado claro | 71 | 9 |
| gris de maure | 87 | 1 |
| claro | 95 | 56 |
| terre de sienne | 99 | 5 |
| châtain | 103 | 25 |
| bistre | 105 | 20 |
| sépia | 138 | 2 |
| **total** | | 123 |

| | Pantone Palette | |
|---|---|---|
| | brightness | number of respondents |
| 411 C | 58 | 1 |
| 7518 C | 73 | 13 |
| 7505 C | 74 | 14 |
| warmgray 11 C | 80 | 5 |
| 4985 C | 93 | 24 |
| warmgray 10 C | 98 | 20 |
| 7504 C | 119 | 39 |
| 4715 C | 130 | 6 |
| 479 C | 143 | 1 |
| **total** | | 123 |

| | Ral-Classic Palette | |
|---|---|---|
| | brightness | number of respondents |
| 7013 | 48 | 1 |
| 8025 | 68 | 2 |
| 8000 | 74 | 3 |
| 6013 | 81 | 27 |
| 7008 | 96 | 58 |
| 1011 | 108 | 12 |
| 1020 | 115 | 1 |
| 1019 | 128 | 19 |
| **total** | | 123 |

| | RgbColors Palette | |
|---|---|---|
| | brightness | number of respondents |
| sepia | 56 | 1 |
| deep ochre | 70 | 11 |
| brown ochre | 83 | 28 |
| brown | 85 | 2 |
| sienna | 103 | 72 |
| warm grey | 117 | 8 |
| peru | 134 | 1 |
| **total** | | 123 |

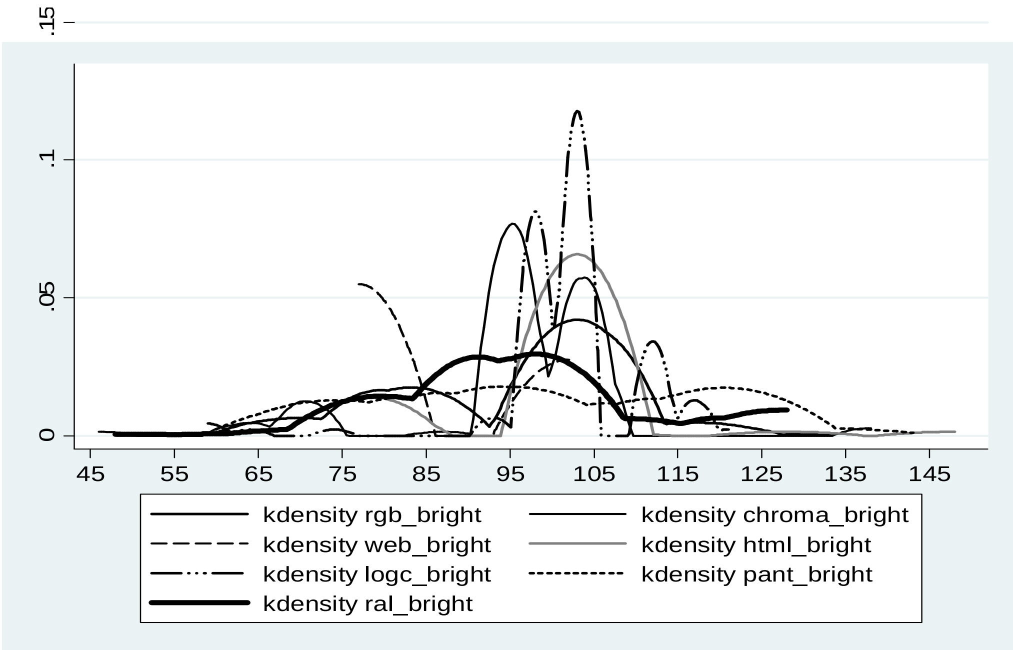
| | LogColors Palette | |
|---|---|---|
| | brightness | number of respondents |
| gray / grey 23 | 59 | 2 |
| gray / grey 25 | 64 | 1 |
| gray / grey 29 | 74 | 1 |
| coral 4 | 93 | 3 |
| salmon 4 | 98 | 38 |
| lightsalmon 4 | 103 | 55 |
| burlywood 4 | 112 | 16 |
| lightpink 4 | 117 | 6 |
| wheat 4 | 121 | 1 |
| **total** | | |

| | HtmlColors Palette | |
|---|---|---|
| | brightness | number of respondents |
| darkolivegreen | 77 | 8 |
| saddlebrown | 79 | 13 |
| sienna | 103 | 97 |
| dimgray | 105 | 1 |
| gray | 128 | 2 |
| indianred | 148 | 2 |
| **total** | | 123 |

| | WebPalette Palette | |
|---|---|---|
| | brightness | number of respondents |
| 666633 | 77 | 32 |
| 663333 | 77 | 50 |
| 996633 | 102 | 41 |
| **Total** | | 123 |

Source: Cassilde's field research data.

### *Figure 1: Kernel Density of Hue Colors given underlying Palettes*



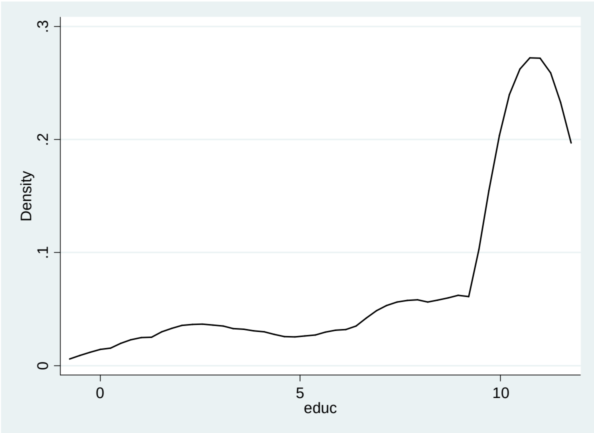

Source: Cassilde's field research data.

### *Table 7: Explanatory Variables - Descriptive Statistics*

| Variables | Descriptives Statistics | Description of the Variables | Type | Number of observations |
|---|---|---|---|---|
| **educ** | 8.89 (3.17) | validated years of schooling | continuous | 123 |
| **licence** | 3.25 % | if respondent did higher education, equals 1 | dummy | 123 |
| **vest_pu** | 7.32 % | if respondent had the *vestibular* in the public sector, equals 1 | dummy | 123 |
| **vest_pr** | 9.76 % | if respondent had the *vestibular* in the private sector, equals 1 | dummy | 123 |
| **vest_porp** | 13.01 % | if respondent had the *vestibular* in the public and / or private sectors, equals 1 | dummy | 123 |
| **vest_pandp** | 4.07 % | if respondent had the *vestibular* both in the public and private sectors, equals 1 | dummy | 123 |
| **supletivo** | 16.26 % | if respondent did the *supletivo*, equals 1 | dummy | 123 |
| **pyramid** | | respondent's occupation in the firm | ordered categorical | 123 |
| unskilled paker | 43.90 % | respondent carries production to and from executants | | |
| executant | 46.34 % | respondent verifies quality of produciton piece by piece | | |
| second-in-command | 6.50 % | respondent does a sample verification of production after executants | | |
| skilled paker | 1.63 % | respondent uses machines to carry production | | |
| manager | 1.63 % | respondent is the chief | | |
| **age** | 27.07 (8.81) | in years | continuous | 123 |
| **men** | 69.92 % | if respondent is a man, equals 1 | dummy | 123 |
| **class** | | respondent's perceived social class | ordered categorical | 123 |
| A | 0.81 % | respondent perceives him/herself as rich | | |
| B | 25.20 % | respondent perceives him/herself as upper middle class | | |
| C | 39.02 % | respondent perceives him/herself as lower middle class | | |
| D | 34.96 % | respondent perceives him/herself as poor | | |
| **NE** | 40.65 % | if respondent was born in the North East region of Brazil, equals 1 | dummy | 123 |

Source: Cassilde's field research data.

***Figure 2: Kernel Density of Years of Schooling***




Source: Cassilde's field research data.

***Table 8: Spare Time, Election Choice, and Control Variables Descriptive Statistics***

| Variables | Descriptives Statistics | Description of the Variables | Type | Number of observations |
|---|---|---|---|---|
| **Spare Time Variables** | | | | |
| **carnival** | 56.91 % | if respondent likes carnival, equals 1 | dummy | 123 |
| **soccer** | 80.49 % | if respondent likes soccer, equals 1 | dummy | 123 |
| **Elections Choice Variable** | | | | |
| **Lula** | 68.29 % | if respondent voted for Lula in the second turn of the 2006 presidential elections, equals 1 | dummy | 123 |
| **Control Variables** | | | | |
| **third** | 56.10 % | if a third is present during the questionnaire, equals 1 | dummy | 123 |
| **blue** | 42.28 % | if respondent works for the Blue firm, equals 1 | dummy | 123 |

Source: Cassilde's field research data.

## *Table 9: Multinomial Probit Estimates – First Open Classification*

| | | [1] | [5] | [6] | [7] |
|---|---|---|---|---|---|
| | | libre_o1a | libre_o1a | libre_o1a | libre_o1a |
| Black | rgb_bright | -0.1751*** | | | |
| | | (0.0317) | | | |
| | web_bright | | -0.1014*** | | |
| | | | (0.0242) | | |
| | pant_bright | | | -0.0919*** | |
| | | | | (0.0171) | |
| | ral_bright | | | | -0.1268*** |
| | | | | | (0.0254) |
| | educ | 0.0835 | 0.1682 | -0.1037 | -0.0733 |
| | | (0.1274) | (0.1318) | (0.0707) | (0.1374) |
| | age | -0.0980** | -0.0145 | -0.0352 | -0.0510 |
| | | (0.0477) | (0.0270) | (0.0385) | (0.0301) |
| | men | -0.5582 | -0.9567 | -0.9617 | -1.0324 |
| | | (0.6489) | (0.5421) | (0.9682) | (0.4988) |
| | pyramid | 0.8928** | 0.6498** | 0.6581** | 0.5648 |
| | | (0.4319) | (0.3697) | (0.3845) | (0.3047) |
| | class | 0.2230 | 0.3133 | 0.3029 | -0.1232 |
| | | (0.3538) | (0.5039) | (0.3163) | (0.5513) |
| | NE | -1.6875** | -0.3391 | -0.4759 | -0.1440 |
| | | (0.7773) | (0.4054) | (0.6645) | (0.7825) |
| | i_bright | -0.0168 | | | |
| | | (0.0497) | | | |
| | constant | 19.4844** | 4.2278** | -3.9010 | 12.2051*** |
| | | (7.9905) | (2.7515) | (2.0916) | (2.2674) |
| Brown | rgb_bright | -0.0567*** | | | |
| | | (0.0204) | | | |
| | web_bright | | -0.0372** | | |
| | | | (0.0160) | | |
| | pant_bright | | | -0.0423*** | |
| | | | | (0.0127) | |
| | ral_bright | | | | -0.0428*** |
| | | | | | (0.0148) |
| | educ | -0.0408 | -0.0648 | 0.1136 | -0.0439 |
| | | (0.0706) | (0.1147) | (0.1221) | (0.0722) |
| | age | -0.0331 | 0.0010 | -0.0369 | -0.0837 |
| | | (0.0311) | (0.0324) | (0.0299) | (0.0817) |
| | men | -0.2000 | -0.1131 | -0.9603 | -1.0659* |
| | | (0.4589) | (0.8901) | (0.6114) | (0.6146) |
| | pyramid | 0.6342** | 0.7949** | -0.2725 | -0.0323 |
| | | (0.3190) | (0.3079) | (0.9929) | (0.8163) |
| | class | -0.1556 | -0.1248 | -0.1150 | 0.1921 |
| | | (0.2475) | (0.2266) | (0.2357) | (0.3121) |
| | NE | 0.1094 | -0.0367 | 0.0367 | 0.1251 |
| | | (0.4344) | (0.7709) | (0.4248) | (0.4112) |
| | i_bright | -0.0094 | | | |
| | | (0.0272) | | | |
| | constant | 8.3571* | 5.7275** | 8.1971*** | 1.9982 |
| | | (4.3713) | (1.9872) | (7.2160) | (4.3206) |
| Yellow | rgb_bright | 0.0356 | | | |
| | | (0.0767) | | | |
| | web_bright | | -0.0196 | | |
| | | | (0.0313) | | |
| | pant_bright | | | 0.0449 | |
| | | | | (0.0556) | |
| | ral_bright | | | | -0.0038 |
| | | | | | (0.0294) |
| | educ | -0.1629 | -0.0451 | -0.0438 | 0.1050 |
| | | (0.1714) | (0.0684) | (0.1378) | (0.1160) |
| | age | -0.0535 | -0.0628 | -0.0598 | -0.0257 |
| | | (0.0834) | (0.0745) | (0.0819) | (0.0393) |
| | men | -1.0900 | -0.4605 | -0.3653 | -0.5339 |
| | | (1.0152) | (0.4391) | (0.4712) | (0.9592) |
| | pyramid | -0.7004 | 0.0983 | 0.7337* | 0.5188* |
| | | (1.1430) | (0.7723) | (0.3249) | (0.3754) |
| | class | 0.3983 | -0.0212 | 0.0141 | 0.0078 |
| | | (0.7186) | (0.2873) | (0.6115) | (0.2393) |
| | NE | -1.2801 | -1.2782** | -1.4842** | -1.2402** |
| | | (1.3863) | (0.5382) | (0.9475) | (0.6188) |
| | i_bright | 0.0651 | | | |
| | | (0.0569) | | | |
| | constant | -10.5148 | 2.8806 | 6.0403*** | 5.9224*** |
| | | (12.7197) | (4.1665) | (2.8584) | (3.4721) |
| | Observations | 122 | 122 | 122 | 122 |

Standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

## *Table 10: Multinomial Probit Estimates – Wide Classification*

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Black (*negra*)** | rgb_bright | -0.1246*** | | | | | | |
| | | (0.0232) | | | | | | |
| | chroma_bright | | -0.1339*** | | | | | |
| | | | (0.0301) | | | | | |
| | pant_bright | | | | -0.0838*** | | | |
| | | | | | (0.0165) | | | |
| | logc_bright | | | | | | | -0.3238*** |
| | | | | | | | | (0.0782) |
| | html_bright | | | | | | -0.1402*** | |
| | | | | | | | (0.0292) | |
| | ral_bright | | | | | -0.1118*** | | |
| | | | | | | (0.0235) | | |
| | educ | 0.2269** | -0.1232 | -0.1981 | 0.0046 | -0.1081 | 0.0734 | -0.1053 |
| | | (0.1024) | (0.3280) | (0.1845) | (0.3743) | (0.0813) | (0.0919) | (0.2086) |
| | pyramid | 0.6751* | 1.1603** | 0.8928** | 0.3839 | 0.2956 | 0.6614 | 0.4926 |
| | | (0.3644) | (0.5104) | (0.2551) | (0.4302) | (0.4212) | (0.4305) | (0.5496) |
| | i_bright | -0.0011 | | | | | | |
| | | (0.0330) | | | | | | |
| | constant | 8.5165* | 9.7860*** | -2.4273*** | -5.4186 | 0.5347 | -1.6760 | -0.0628 |
| | | (4.8058) | (6.1398) | (3.4596) | (6.5420) | (2.5945) | (2.6937) | (10.0105) |
| **Black (*preta*)** | rgb_bright | -0.0930*** | | | | | | |
| | | (0.0255) | | | | | | |
| | chroma_bright | | -0.1044*** | | | | | |
| | | | (0.0326) | | | | | |
| | pant_bright | | | | -0.0572*** | | | |
| | | | | | (0.0187) | | | |
| | logc_bright | | | | | | | -0.2157*** |
| | | | | | | | | (0.0819) |
| | html_bright | | | | | | -0.0967*** | |
| | | | | | | | (0.0318) | |
| | ral_bright | | | | | -0.0640** | | |
| | | | | | | (0.0258) | | |
| | educ | 0.0161 | -0.1697 | 0.3324 | -0.2802 | -0.0004 | -0.0310 | -0.2003 |
| | | (0.0899) | (0.0815) | (0.3223) | (0.2470) | (0.0910) | (0.2058) | (0.0944) |
| | pyramid | 0.3017 | 0.6391* | 0.1131 | -0.0507 | 0.6559* | 0.1677 | 0.7455 |
| | | (0.4377) | (0.4283) | (0.7340) | (0.6021) | (0.5251) | (0.2791) | (0.4411) |
| | i_bright | -0.0528 | | | | | | |
| | | (0.0564) | | | | | | |
| | constant | 13.4611* | 7.3416*** | -0.6166 | 5.1115*** | 2.4808 | 11.4179*** | 11.5102 |
| | | (7.2722) | (3.0649) | (0.7613) | (1.7285) | (1.2582) | (3.2208) | (3.4992) |

Table 10 : to be continued…

Table 10 : continued…

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Cabocla** | rgb_bright | 0.0153 | | | | | | |
| | | (0.0621) | | | | | | |
| | chroma_bright | | -0.0516 | | | | | |
| | | | (0.0746) | | | | | |
| | pant_bright | | | | 0.0345 | | | |
| | | | | | (0.0523) | | | |
| | logc_bright | | | | | | | -0.0712 |
| | | | | | | | | (0.0981) |
| | html_bright | | | | | | -0.0345 | |
| | | | | | | | (0.0568) | |
| | ral_bright | | | | | -0.0198 | | |
| | | | | | | (0.0362) | | |
| | educ | -0.3282 | 0.1246** | -0.1280 | 0.1019* | 0.1314 | 0.3471 | 0.3544 |
| | | (0.3392) | (0.0962) | (0.0873) | (0.0604) | (0.2078) | (0.2346) | (0.0959) |
| | pyramid | 0.5360 | 0.1222 | 0.4951 | 1.1081** | 0.5904 | 0.5124 | 0.8185 |
| | | (0.9483) | (0.5382) | (0.3846) | (0.3559) | (0.2818) | (0.4199) | (0.3093) |
| | i_bright | -0.1038 | | | | | | |
| | | (0.2357) | | | | | | |
| | constant | 9.7144 | -3.4717 | -1.0884 | 0.5684 | -4.7926 | 2.2679 | 5.8434 |
| | | (28.5463) | (5.4312) | (1.1749) | (1.1530) | (3.5580) | (4.3087) | (6.5331) |
| **Indian** | rgb_bright | -0.0144 | | | | | | |
| | | (0.0606) | | | | | | |
| | chroma_bright | | -0.0111 | | | | | |
| | | | (0.0587) | | | | | |
| | pant_bright | | | | 0.0104 | | | |
| | | | | | (0.0482) | | | |
| | logc_bright | | | | | | | -0.1025 |
| | | | | | | | | (0.1068) |
| | html_bright | | | | | | -0.0372 | |
| | | | | | | | (0.0833) | |
| | ral_bright | | | | | -0.0332 | | |
| | | | | | | (0.0406) | | |
| | educ | 0.1264 | 0.3678 | 0.1442* | 0.1068 | 0.1899** | -0.2164 | 0.1869* |
| | | (0.2498) | (0.2122) | (0.0759) | (0.0946) | (0.3270) | (0.0943) | (0.0825) |
| | pyramid | 0.6379 | 0.6210 | 0.2290 | 0.7076 | 0.6276 | 0.3184 | 1.1726** |
| | | (0.6951) | (0.7439) | (0.4017) | (0.4504) | (0.3386) | (0.6309) | (0.4564) |
| | i_bright | -0.0248 | | | | | | |
| | | (0.0995) | | | | | | |
| | constant | 0.5803 | 8.4302*** | -1.3483* | 2.7096** | 1.3231 | 8.5656*** | 29.9095*** |
| | | (13.0478) | (2.8341) | (0.5723) | (2.2253) | (4.1769) | (8.8942) | (11.0120) |

Table 10 : to be continued…

Table 10 : continued…

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Mulatto** | rgb_bright | -0.0046 | | | | | | |
| | | (0.0378) | | | | | | |
| | chroma_bright | | 0.0050 | | | | | |
| | | | (0.0456) | | | | | |
| | pant_bright | | | | -0.0216 | | | |
| | | | | | (0.0215) | | | |
| | logc_bright | | | | | | | -0.1279 |
| | | | | | | | | (0.0779) |
| | html_bright | | | | | | -0.0360 | |
| | | | | | | | (0.0409) | |
| | ral_bright | | | | | -0.0412 | | |
| | | | | | | (0.0273) | | |
| | educ | -0.1069 | 0.0295 | 0.0669 | -0.1138 | 0.3568 | 0.1186 | 0.0897 |
| | | (0.1104) | (0.0621) | (0.0841) | (0.2576) | (0.0935) | (0.0610) | (0.0605) |
| | pyramid | 1.3406** | 0.3603 | 0.6940** | 0.3932 | 0.3049 | 0.7003** | 0.1798 |
| | | (0.5245) | (0.8510) | (0.5728) | (1.9184) | (0.6066) | (0.4958) | (0.3739) |
| | i_bright | 0.0600* | | | | | | |
| | | (0.0336) | | | | | | |
| | constant | -9.1188 | -2.2172 | -3.5100 | -4.9665 | 7.5252*** | 0.1321 | 6.7509 |
| | | (5.8638) | (4.5208) | (2.3326) | (4.8557) | (2.3938) | (2.9308) | (8.1310) |
| **Brown** | rgb_bright | -0.0404** | | | | | | |
| | | (0.0168) | | | | | | |
| | chroma_bright | | -0.0868*** | | | | | |
| | | | (0.0274) | | | | | |
| | pant_bright | | | | -0.0361*** | | | |
| | | | | | (0.0108) | | | |
| | logc_bright | | | | | | | -0.1133*** |
| | | | | | | | | (0.0343) |
| | html_bright | | | | | | -0.0659** | |
| | | | | | | | (0.0265) | |
| | ral_bright | | | | | -0.0207* | | |
| | | | | | | (0.0118) | | |
| | educ | 0.0904 | 0.2219** | 0.1096 | 0.3863 | -0.2045 | 0.1442 | 0.1330 |
| | | (0.0611) | (0.1008) | (0.2242) | (0.0818) | (0.0586) | (0.3283) | (0.3221) |
| | pyramid | 0.3003 | 0.7550 | 0.5636 | 0.7536** | 0.9496** | 0.3438 | 0.5558 |
| | | (0.2887) | (0.2972) | (0.2826) | (0.8551) | (0.4202) | (0.8147) | (0.6631) |
| | i_bright | -0.0247 | | | | | | |
| | | (0.0262) | | | | | | |
| | constant | 6.0897* | -2.8101 | -1.3372 | -6.0390 | 4.7095** | 6.0257** | 10.8230*** |
| | | (3.6232) | (2.5950) | (0.7656) | (5.8841) | (2.2007) | (6.0778) | (7.8775) |

Table 10 : to be continued…

Table 10 : continued…

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Yellow** | rgb_bright | -0.0299 | | | | | | |
| | | (0.0298) | | | | | | |
| | chroma_bright | | -0.0177 | | | | | |
| | | | (0.0427) | | | | | |
| | pant_bright | | | | 0.0054 | | | |
| | | | | | (0.0238) | | | |
| | logc_bright | | | | | | | -0.0484 |
| | | | | | | | | (0.0558) |
| | html_bright | | | | | | -0.0328 | |
| | | | | | | | (0.0493) | |
| | ral_bright | | | | | -0.0033 | | |
| | | | | | | (0.0229) | | |
| | educ | 0.4395 | 0.1315 | -0.0336 | 0.1885** | 0.0805 | -0.1281 | 0.0039 |
| | | (0.3559) | (0.2327) | (0.0567) | (0.0952) | (0.2358) | (0.0805) | (0.2350) |
| | pyramid | 0.0481 | 0.3670 | 0.2403 | 0.8593 | 0.0781 | 0.9844** | 0.8188** |
| | | (0.5414) | (0.3454) | (0.4694) | (0.3024) | (0.7893) | (0.3419) | (0.8458) |
| | i_bright | 0.0381 | | | | | | |
| | | (0.0353) | | | | | | |
| | constant | -7.5497 | 3.3792 | -4.8597 | 4.1127** | -0.4777 | 2.2724 | 20.4625** |
| | | (6.4337) | (6.8709) | (0.8793) | (1.8672) | (4.5036) | (5.8709) | (7.7197) |
| | Observations | 121 | 121 | 121 | 121 | 121 | 121 | 121 |

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

## *Table 11: Multinomial Probit Estimates – IBGE Classification – Part 1*

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| Black | rgb_bright | -0.1717*** | | | | | | |
| | | (0.0319) | | | | | | |
| | chroma_bright | | -0.2047*** | | | | | |
| | | | (0.0439) | | | | | |
| | web_bright | | | -0.1039*** | | | | |
| | | | | (0.0275) | | | | |
| | logc_bright | | | | | | | -0.5081*** |
| | | | | | | | | (0.1083) |
| | html_bright | | | | | | -0.1671*** | |
| | | | | | | | (0.0370) | |
| | ral_bright | | | | | -0.1442*** | | |
| | | | | | | (0.0308) | | |
| | pant_bright | | | | -0.1225*** | | | |
| | | | | | (0.0242) | | | |
| | educ | -0.1770 | -0.0594 | -0.0365 | 0.0206 | -0.1860 | -0.1823* | 0.0284 |
| | | (0.1175) | (0.0985) | (0.0876) | (0.1103) | (0.1041) | (0.0750) | (0.0821) |
| | age | -0.1158** | -0.1506 | -0.1182 | -0.0425 | -0.0783* | -0.0654* | -0.1709 |
| | | (0.0483) | (0.0326) | (0.0275) | (0.0429) | (0.0874) | (0.0298) | (0.0334) |
| | men | -0.7371 | -1.0016 | -0.6196 | 0.0006 | -0.6024 | 0.3093 | -0.2199 |
| | | (0.7674) | (0.7327) | (0.9709) | (1.0050) | (1.0066) | (0.6469) | (0.5733) |
| | pyramid | 1.0818** | 0.4139 | 0.5183* | 1.0011* | 0.3750 | 0.9350** | 0.7079** |
| | | (0.4420) | (0.5879) | (0.5507) | (0.5799) | (0.3784) | (0.2962) | (0.6194) |
| | class | 0.0082 | 0.4456* | 0.2480 | 0.3504 | 0.3698 | 0.2095 | 0.1777 |
| | | (0.3501) | (0.5377) | (0.2863) | (0.4948) | (0.3245) | (0.2411) | (0.5260) |
| | NE | -1.3893 | -0.3405 | -1.0971 | -1.4010* | -1.2364* | -1.3422* | -1.7265 |
| | | (0.8533) | (1.1245) | (1.0002) | (0.4453) | (1.0559) | (0.4298) | (0.7854) |
| | i_bright | -0.0136 | -0.0283 | | | | | 0.1388 |
| | | (0.0392) | (0.0192) | | | | | (0.1164) |
| | blue | 0.1705 | 0.2619 | 0.2703 | 1.2214*** | 0.4246 | 0.9511** | 0.2620 |
| | | (0.7068) | (0.9791) | (0.8976) | (0.8792) | (0.9100) | (0.4426) | (1.0098) |
| | third | 0.0715 | 0.2505 | -0.9919 | -0.1318 | 0.2293 | -0.2876 | -0.0825 |
| | | (0.6315) | (0.4016) | (0.8029) | (0.5892) | (0.8486) | (0.5541) | (0.4301) |
| | constant | 21.6576*** | 11.6370** | 7.4912** | 3.8639* | 2.0442 | 6.1514 | 10.7730 |
| | | (6.8881) | (6.0109) | (2.1582) | (2.2643) | (5.2865) | (3.8716) | (17.4551) |

Table 11: to be continued…

Table 11: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| | rgb_bright | -0.0786** | | | | | | |
| | | (0.0399) | | | | | | |
| | chroma_bright | | -0.1131 | | | | | |
| | | | (0.0764) | | | | | |
| | web_bright | | | -0.0615* | | | | |
| | | | | (0.0334) | | | | |
| | logc_bright | | | | | | | -0.3373*** |
| | | | | | | | | (0.1242) |
| | html_bright | | | | | | -0.0553 | |
| | | | | | | | (0.0609) | |
| | ral_bright | | | | | -0.0630* | | |
| | | | | | | (0.0330) | | |
| | pant_bright | | | | -0.0417 | | | |
| | | | | | (0.0266) | | | |
| | educ | -0.1913 | 0.0716 | 0.0145 | -0.1569 | 0.0136 | -0.1867 | -0.1784 |
| | | (0.1648) | (0.0789) | (0.1575) | (0.1564) | (0.0747) | (0.0991) | (0.1200) |
| **Brown** | age | -0.1616* | -0.0373 | -0.0126 | -0.0724* | -0.0287 | -0.1188 | -0.1121** |
| | | (0.0982) | (0.0427) | (0.0321) | (0.0307) | (0.0302) | (0.0872) | (0.1059) |
| | men | -0.5808 | -0.2687 | -0.2291 | -0.3252 | -0.9962 | -0.1744 | -1.2195 |
| | | (1.0014) | (1.1409) | (0.6070) | (0.7557) | (0.7048) | (0.5080) | (1.0574) |
| | pyramid | 1.1645* | 0.8884 | 0.9057** | 0.9017** | 0.8076** | 0.9165* | 1.2992** |
| | | (0.6111) | (0.3258) | (0.3716) | (0.3368) | (0.3016) | (0.5373) | (0.4534) |
| | class | 0.0926 | 0.6409* | 0.2163 | 0.1910 | 0.2458 | 0.2464 | 0.2061 |
| | | (0.5097) | (0.2634) | (0.2323) | (0.3364) | (0.2414) | (0.3136) | (0.2713) |
| | NE | -0.8977 | -1.1479* | -0.9128 | -0.8835 | -1.0656 | -0.4150 | -0.8965* |
| | | (1.1067) | (0.4503) | (0.5587) | (0.7421) | (0.4182) | (0.7090) | (0.4664) |
| | i_bright | -0.0820 | -0.0314 | | | | | -0.0005 |
| | | (0.0932) | (0.0298) | | | | | (0.1612) |
| | blue | 0.4558 | 1.1305** | 0.4584 | 0.2467 | 0.1633 | 0.3550 | 0.5687 |
| | | (0.9351) | (0.4426) | (0.4248) | (0.6641) | (0.4252) | (0.8676) | (0.4624) |
| | third | -0.9943 | 0.0595 | 0.0337 | -0.9130 | 0.0578 | 0.1431 | -0.2209 |
| | | (0.8577) | (0.8416) | (0.3734) | (0.3980) | (0.3897) | (0.3821) | (0.6211) |
| | constant | 21.0680 | 17.7717* | 7.1301 | 13.5093*** | 8.9576* | 18.8967*** | 39.0939* |
| | | (12.8910) | (4.7845) | (3.0174) | (3.7809) | (2.3706) | (4.9443) | (9.7252) |

Table 11: to be continued...

Table 11: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Indian** | rgb_bright | -0.0601*** | | | | | | |
| | | (0.0207) | | | | | | |
| | chroma_bright | | -0.1327*** | | | | | |
| | | | (0.0396) | | | | | |
| | web_bright | | | -0.0400** | | | | |
| | | | | (0.0165) | | | | |
| | logc_bright | | | | | | | -0.2172*** |
| | | | | | | | | (0.0550) |
| | html_bright | | | | | | -0.0730** | |
| | | | | | | | (0.0315) | |
| | ral_bright | | | | | -0.0367** | | |
| | | | | | | (0.0148) | | |
| | pant_bright | | | | -0.0515*** | | | |
| | | | | | (0.0136) | | | |
| | educ | 0.0030 | -0.1374 | -0.1794 | -0.1361 | -0.1108 | -0.0118 | -0.2162 |
| | | (0.0762) | (0.1642) | (0.0721) | (0.0755) | (0.1623) | (0.1590) | (0.1821) |
| | age | -0.0486 | -0.0734* | -0.0164 | -0.1177 | -0.1370 | -0.0314 | -0.0308 |
| | | (0.0325) | (0.1113) | (0.0896) | (0.0866) | (0.0408) | (0.0388) | (0.0526) |
| | men | 0.0848 | -1.2993* | 0.2812 | -1.0234 | 0.0158 | -0.2461 | -0.9892 |
| | | (0.5390) | (0.5721) | (0.5006) | (0.5495) | (0.5448) | (0.9476) | (0.7611) |
| | pyramid | 0.5443 | 0.7338* | 1.0687* | 0.5365 | 0.9453* | 0.4331 | 1.0883** |
| | | (0.3324) | (0.3834) | (0.3108) | (0.4212) | (0.5517) | (0.3717) | (0.3491) |
| | class | 0.1362 | 0.4404 | 0.3475 | 0.2164 | 0.2389 | 0.3115 | 0.2003 |
| | | (0.2528) | (0.3381) | (0.4814) | (0.2447) | (0.4851) | (0.4997) | (0.3622) |
| | NE | -0.1963 | -0.9004 | -0.4667 | -0.4124 | -0.3467 | -0.9009 | -1.9052** |
| | | (0.4549) | (0.6888) | (0.4159) | (1.0311) | (0.7403) | (1.0143) | (1.2048) |
| | i_bright | -0.0485* | -0.0070 | | | | | 0.0900 |
| | | (0.0282) | (0.0146) | | | | | (0.0834) |
| | blue | 1.1865*** | -0.0114 | 1.1838*** | 0.5605 | 1.1397*** | -0.3341 | 1.3614*** |
| | | (0.4465) | (0.6460) | (0.5561) | (0.4532) | (0.6574) | (0.6518) | (0.7286) |
| | third | 0.2387 | -0.9187 | 0.1519 | 0.2986 | -0.9764 | -0.9962 | -1.2651 |
| | | (0.3991) | (0.5415) | (0.4791) | (0.8256) | (0.5789) | (0.7918) | (0.9028) |
| | constant | 10.7705** | 24.1341*** | 1.3043 | 6.0626 | 15.0930*** | 7.8583 | 39.7287** |
| | | (4.5973) | (10.7112) | (4.8181) | (4.7730) | (4.1455) | (7.7299) | (23.4176) |
| | Observations | 122 | 122 | 122 | 122 | 122 | 122 | 122 |

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

## *Table 12: Multinomial Probit Estimates – IBGE Classification – Part 2*

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| Black | rgb_bright | -0.2061*** | | | | | | |
| | | (0.0394) | | | | | | |
| | chroma_bright | | -0.2178*** | | | | | |
| | | | (0.0474) | | | | | |
| | web_bright | | | -0.1167*** | | | | |
| | | | | (0.0301) | | | | |
| | pant_bright | | | | -0.1362*** | | | |
| | | | | | (0.0275) | | | |
| | ral_bright | | | | | -0.1555*** | | |
| | | | | | | (0.0335) | | |
| | html_bright | | | | | | -0.1852*** | |
| | | | | | | | (0.0422) | |
| | logc_bright | | | | | | | -0.5343*** |
| | | | | | | | | (0.1088) |
| | educ | -0.2428* | 0.0602 | -0.0004 | 0.0001 | -0.4333 | -0.0265 | 0.0018 |
| | | (0.1369) | (0.2220) | (0.2981) | (0.0778) | (0.0765) | (0.0763) | (0.0848) |
| | age | -0.1727*** | -0.2083 | -0.0301 | -0.0607* | -0.2582* | -0.0882** | -0.1507** |
| | | (0.0575) | (0.1329) | (0.1608) | (0.0455) | (0.0313) | (0.1244) | (0.0598) |
| | men | -0.5371 | -1.3007 | -1.3092 | -0.6972 | -1.5342 | -0.5779 | -2.5412 |
| | | (0.8924) | (0.6638) | (1.3925) | (1.3090) | (0.7832) | (0.7363) | (0.8721) |
| | pyramid | 1.2476** | 0.7352* | 1.6841** | 0.6766* | 0.9091** | 0.4166 | 1.1594** |
| | | (0.4882) | (0.4078) | (0.4036) | (0.4567) | (0.4033) | (0.3109) | (0.4929) |
| | class | 0.0056 | 0.6544* | 0.4426 | 0.4068 | -0.0627 | 0.0731 | -0.0504 |
| | | (0.4058) | (0.3607) | (0.2484) | (0.3721) | (0.3596) | (0.3414) | (0.3965) |
| | NE | -1.6314 | -1.1374 | -0.9753* | -0.4815 | -1.5804* | -0.4281 | -0.9707** |
| | | (1.0006) | (1.5042) | (1.5573) | (0.4733) | (0.4314) | (1.3754) | (0.4898) |
| | i_bright | -0.0236 | -0.0274 | | | | | 0.1728 |
| | | (0.0436) | (0.0198) | | | | | (0.1248) |
| | blue | 0.3291 | 0.0145 | 0.3292 | 0.2681 | 0.3544 | 0.0045 | 0.2754 |
| | | (0.7732) | (1.2268) | (0.4542) | (1.1421) | (0.4541) | (1.0788) | (0.5045) |
| | third | -0.0547 | 0.2640 | -0.0161 | -0.3387 | 0.2142 | -0.4234 | -3.2356* |
| | | (0.6909) | (1.0421) | (0.3858) | (0.4152) | (0.6285) | (1.0941) | (1.7005) |
| | carnival | 0.1523 | 0.4043 | -0.3747 | -0.4964 | 0.4666 | -0.1229 | 3.5333* |
| | | (0.7006) | (0.4136) | (0.5069) | (0.4167) | (0.6274) | (1.3167) | (2.1150) |
| | soccer | -1.1230 | -0.1825 | -0.1557 | -0.5819 | -0.8923 | -0.8470 | -1.4895 |
| | | (0.9501) | (1.1220) | (0.7142) | (0.9050) | (0.8340) | (0.7701) | (0.8820) |
| | Lula | 1.8026** | 0.8592** | 1.0957* | 0.8722** | 1.1530* | 1.2401* | 0.8478* |
| | | (0.7923) | (1.2925) | (0.5670) | (0.7180) | (1.6045) | (0.4169) | (0.7343) |
| | constant | 27.3006*** | 25.5340*** | 8.2318** | 9.4003 | 2.2727 | 13.1977 | 39.4018** |
| | | (8.2063) | (5.0638) | (2.2837) | (4.1688) | (2.4979) | (9.5231) | (17.7469) |

Table 12: to be continued…

Table 12: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Brown** | rgb_bright | -0.1062** | | | | | | |
| | | (0.0480) | | | | | | |
| | chroma_bright | | -0.1403* | | | | | |
| | | | (0.0773) | | | | | |
| | web_bright | | | -0.1108** | | | | |
| | | | | (0.0481) | | | | |
| | pant_bright | | | | -0.0532 | | | |
| | | | | | (0.0326) | | | |
| | ral_bright | | | | | -0.1087** | | |
| | | | | | | (0.0499) | | |
| | html_bright | | | | | | -0.0869 | |
| | | | | | | | (0.0668) | |
| | logc_bright | | | | | | | -0.4329*** |
| | | | | | | | | (0.1257) |
| | educ | -0.3642 | -0.0809 | -0.0748 | -0.3123 | -0.0031 | -0.2030* | -0.5554* |
| | | (0.2390) | (0.1032) | (0.0739) | (0.1213) | (0.2813) | (0.2273) | (0.1317) |
| | age | -0.2586* | -0.0553 | -0.2700* | -0.1840 | -0.1047** | -0.1889 | -0.3553** |
| | | (0.1390) | (0.0344) | (0.0289) | (0.1215) | (0.1471) | (0.0415) | (0.1644) |
| | men | -1.1754 | -0.3093 | -0.8031 | -0.7828 | 0.1212 | -0.0438 | 0.0606 |
| | | (1.3558) | (0.8300) | (0.5736) | (0.8458) | (1.4695) | (0.5863) | (0.6457) |
| | pyramid | 1.5011** | 0.3950 | 1.0202** | 1.0812** | 1.4029** | 1.1502* | 1.8985** |
| | | (0.7580) | (0.6877) | (0.7409) | (0.3631) | (0.3134) | (0.3978) | (0.3807) |
| | class | -0.0940 | 0.5342* | 0.3257 | 0.3095 | 0.3257 | 0.3402 | 0.3459 |
| | | (0.6010) | (0.2782) | (0.5973) | (0.5989) | (0.6089) | (0.5884) | (0.7442) |
| | NE | -1.8634 | -1.2881 | -2.4244 | -1.7270 | -0.3668 | -1.5517 | -4.2996* |
| | | (1.5612) | (0.4704) | (0.5911) | (0.8181) | (1.9002) | (0.7577) | (0.8641) |
| | i_bright | -0.0939 | -0.0292 | | | | | 0.0225 |
| | | (0.1174) | (0.0337) | | | | | (0.2028) |
| | blue | -0.0830 | 1.2055** | 1.3501*** | 1.4528*** | -0.1161 | 1.0745** | -0.9367 |
| | | (1.1799) | (0.4730) | (0.6025) | (0.4994) | (1.2574) | (0.6913) | (1.6719) |
| | third | -1.7927 | -1.4092 | -1.9474 | 0.3487 | -2.0477 | -1.6206 | -0.1883 |
| | | (1.2093) | (0.4147) | (1.2258) | (1.0827) | (1.2964) | (0.3955) | (0.6674) |
| | carnival | 1.8635 | 1.5485 | 2.1420 | -0.0162 | 2.5574 | 1.7180 | 0.4693 |
| | | (1.4287) | (0.5896) | (1.4916) | (1.3338) | (1.6277) | (0.5823) | (0.6664) |
| | soccer | -0.3394 | -0.4296 | -0.2945 | -0.4465 | -0.4760 | -0.7017 | -0.6056 |
| | | (1.2834) | (0.5845) | (1.1888) | (1.1743) | (1.3218) | (0.5695) | (1.3293) |
| | Lula | 1.7917 | 0.9371 | 2.7759** | 1.3642* | 0.9002** | 0.9147** | 1.2933* |
| | | (1.2893) | (0.6261) | (0.4209) | (1.3325) | (0.4152) | (1.3203) | (0.4557) |
| | constant | 28.6083 | 21.6521* | 1.8676 | 4.3771* | 16.7696*** | 20.6643*** | 11.4286 |
| | | (17.4417) | (6.4632) | (9.1644) | (2.4097) | (4.6255) | (5.4820) | (29.4216) |

Table 12: to be continued…

Table 12: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| Indian | rgb_bright | -0.0743*** | | | | | | |
| | | (0.0233) | | | | | | |
| | chroma_bright | | -0.1426*** | | | | | |
| | | | (0.0425) | | | | | |
| | web_bright | | | -0.0494*** | | | | |
| | | | | (0.0178) | | | | |
| | pant_bright | | | | -0.0571*** | | | |
| | | | | | (0.0146) | | | |
| | ral_bright | | | | | -0.0402** | | |
| | | | | | | (0.0157) | | |
| | html_bright | | | | | | -0.0860** | |
| | | | | | | | (0.0356) | |
| | logc_bright | | | | | | | -0.2280*** |
| | | | | | | | | (0.0573) |
| | educ | -0.0220 | -0.2335 | -0.4823 | -0.1651 | -0.1449 | -0.3140 | -0.2410* |
| | | (0.0784) | (0.0802) | (0.0923) | (0.2341) | (0.1132) | (0.1044) | (0.3124) |
| | age | -0.0739** | -0.0973** | -0.0352 | -0.0998** | -0.0456 | -0.0466 | -0.0568 |
| | | (0.0348) | (0.0464) | (0.0341) | (0.0321) | (0.0445) | (0.0308) | (0.0361) |
| | men | 0.1638 | -1.6287 | 0.2967 | 0.2759 | -0.9265 | 0.4684 | -1.1803 |
| | | (0.6439) | (1.4188) | (0.7007) | (0.6384) | (0.6033) | (1.2301) | (1.8329) |
| | pyramid | 0.5529 | 0.9947 | 0.6471* | 1.3602* | 0.4215 | 0.9684** | 0.7900** |
| | | (0.3536) | (0.3407) | (0.3389) | (0.7079) | (0.7046) | (0.6654) | (0.8172) |
| | class | 0.2609 | 0.3362 | 0.1775 | 0.0141 | 0.3208 | 0.3903 | 0.2685 |
| | | (0.2684) | (0.6108) | (0.3044) | (0.2586) | (0.2539) | (0.2565) | (0.2912) |
| | NE | -0.1494 | -0.2454 | -0.4849 | -1.6587** | -2.9036 | -1.4524* | -2.1968** |
| | | (0.4827) | (0.7399) | (0.4336) | (1.4756) | (0.8636) | (0.4474) | (2.3682) |
| | i_bright | -0.0485 | -0.0064 | | | | | 0.0950 |
| | | (0.0301) | (0.0150) | | | | | (0.0885) |
| | blue | 1.2922*** | -0.0671 | -0.3497 | 0.4124 | 1.3464*** | -0.2005 | 1.6153*** |
| | | (0.4837) | (0.6981) | (1.3575) | (0.7265) | (0.7036) | (0.4696) | (0.8015) |
| | third | 0.2893 | -0.0205 | 0.1381 | -1.5025 | -0.1400 | 0.1350 | -0.4890 |
| | | (0.4217) | (0.5684) | (0.4994) | (0.6577) | (0.4036) | (0.5895) | (0.4496) |
| | carnival | -0.3700 | -0.1345 | 0.0007 | 1.4775 | -0.2223 | 0.2630 | -0.1357 |
| | | (0.4206) | (1.3042) | (0.3940) | (0.6381) | (0.3995) | (0.4059) | (0.4357) |
| | soccer | -0.4331 | -0.3610 | 0.1590 | -0.9160 | -1.2856 | -0.5344 | -0.6954 |
| | | (0.5941) | (0.7545) | (0.5360) | (0.5764) | (0.5521) | (1.1728) | (0.6247) |
| | Lula | 0.9724** | 1.8065 | 1.0311** | 1.9615 | 2.6235 | 1.8940 | 3.4842* |
| | | (0.4420) | (0.4339) | (1.3835) | (0.4313) | (0.6719) | (0.6526) | (1.9483) |
| | constant | 12.3508** | 12.3843** | 16.3067* | 15.0731*** | 18.4241* | 7.3405* | 54.3955* |
| | | (5.0502) | (12.6754) | (3.2275) | (6.8417) | (9.6039) | (4.2855) | (10.1208) |
| | Observations | 122 | 122 | 122 | 122 | 122 | 122 | 122 |

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

## *Table 13: Multinomial Probit Estimates – IBGE Classification – Part 3*

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| Black | rgb_bright | -0.2107*** | | | | | | |
| | | (0.0403) | | | | | | |
| | chroma_bright | | -0.2291*** | | | | | |
| | | | (0.0499) | | | | | |
| | web_bright | | | -0.1169*** | | | | |
| | | | | (0.0305) | | | | |
| | pant_bright | | | | -0.1419*** | | | |
| | | | | | (0.0285) | | | |
| | ral_bright | | | | | -0.1597*** | | |
| | | | | | | (0.0341) | | |
| | html_bright | | | | | | -0.1854*** | |
| | | | | | | | (0.0426) | |
| | logc_bright | | | | | | | -0.5926*** |
| | | | | | | | | (0.1287) |
| | educ | -0.2615* | -0.3289 | -0.0795 | -0.0249 | -0.5203* | -0.2034* | -0.0273 |
| | | (0.1405) | (0.1047) | (0.3649) | (0.2700) | (0.0784) | (0.2532) | (0.3478) |
| | vest_pr | -0.5567 | -1.2948* | -0.6334 | -0.8735* | -0.2467 | 0.1541 | -1.1031 |
| | | (0.7398) | (0.7131) | (0.5848) | (0.4639) | (0.6678) | (0.6733) | (0.8416) |
| | age | -0.1749*** | -0.0965** | -0.0290 | -0.0646** | -0.1081** | -0.0866** | -0.1590*** |
| | | (0.0586) | (0.1643) | (0.0342) | (0.0461) | (0.1374) | (0.0417) | (0.1757) |
| | men | -0.4162 | -1.3516 | -0.7494 | -0.6889 | 0.1222 | -0.3056 | -2.4493 |
| | | (0.9222) | (0.6810) | (1.5785) | (0.6677) | (1.6016) | (0.5971) | (0.9079) |
| | pyramid | 1.3463*** | 1.2824 | 2.0385** | 1.1788** | 0.9440** | 1.0326** | 1.1982** |
| | | (0.5072) | (0.4126) | (0.4113) | (0.4673) | (0.3246) | (0.7528) | (0.8487) |
| | class | 0.0611 | 0.6135** | 0.3953 | -0.0446 | 0.3527 | 0.4044 | 0.4085 |
| | | (0.4166) | (0.3785) | (0.3116) | (0.3827) | (0.6377) | (0.6845) | (0.7317) |
| | NE | -1.6497 | -1.1351 | -0.9663 | -1.6867** | -3.3222 | -1.6082 | -0.9895** |
| | | (1.0094) | (0.7488) | (0.5973) | (0.4903) | (2.2592) | (1.3915) | (2.5538) |
| | i_bright | -0.0306 | -0.0279 | | | | | 0.1558 |
| | | (0.0442) | (0.0200) | | | | | (0.1322) |
| | blue | 0.5132 | 0.1267 | 0.4222 | 0.7555 | 1.3824*** | 1.1074** | 1.7391*** |
| | | (0.7956) | (1.3865) | (0.6099) | (1.2813) | (0.7194) | (0.6969) | (0.5282) |
| | third | 0.0678 | -1.7338 | -2.6906* | -1.8747 | -0.0553 | -0.3893 | -3.4141* |
| | | (0.7028) | (0.4216) | (0.5064) | (0.4233) | (0.4121) | (0.5949) | (1.9350) |
| | carnival | 0.1322 | 0.4411 | -0.0465 | -0.0593 | 0.4858 | 0.2253 | 0.5408 |
| | | (0.7091) | (1.4188) | (1.4740) | (0.6505) | (0.6399) | (0.5933) | (0.6789) |
| | soccer | -1.3245 | -0.5060 | -0.7429 | -1.0733 | -1.7012 | -0.8904 | -0.8884 |
| | | (0.9762) | (1.3139) | (0.7131) | (0.9245) | (0.8437) | (0.5785) | (0.9003) |
| | Lula | 1.7758** | 1.8580 | 1.1033* | 2.3314* | 1.1717* | 0.9632** | 1.5983** |
| | | (0.8117) | (1.4437) | (1.4624) | (0.7370) | (0.6939) | (1.4041) | (0.4771) |
| | constant | 29.9910*** | 26.2857*** | 3.9436 | 16.7922*** | 17.6930*** | 8.6693* | 41.6397* |
| | | (9.1047) | (15.4022) | (2.6480) | (2.9339) | (10.3651) | (4.4467) | (11.1269) |

Table 13: to be continued…

Table 13: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| Brown | rgb_bright | -0.1252** | | | | | | |
| | | (0.0524) | | | | | | |
| | chroma_bright | | -0.1477* | | | | | |
| | | | (0.0836) | | | | | |
| | web_bright | | | -0.1550** | | | | |
| | | | | (0.0640) | | | | |
| | pant_bright | | | | -0.0692* | | | |
| | | | | | (0.0376) | | | |
| | ral_bright | | | | | -0.1132** | | |
| | | | | | | (0.0511) | | |
| | html_bright | | | | | | -0.0735 | |
| | | | | | | | (0.0717) | |
| | logc_bright | | | | | | | -0.4611*** |
| | | | | | | | | (0.1495) |
| | educ | -0.4876* | -0.0796 | -0.0208 | -0.1768 | -0.1509 | -0.3909 | -0.6412* |
| | | (0.2738) | (0.2593) | (0.0938) | (0.0801) | (0.1157) | (0.0775) | (0.1358) |
| | age | -0.2986** | -0.2535 | -0.0379 | -0.1011** | -0.0513 | -0.0468 | -0.0635* |
| | | (0.1483) | (0.0349) | (0.0294) | (0.0329) | (0.0321) | (0.0309) | (0.0376) |
| | vest_pr | -1.4646* | -0.6596 | -1.7254** | -1.4524** | -1.4050* | -1.0323 | -0.8336* |
| | | (0.7550) | (0.4151) | (0.3927) | (0.7290) | (0.7703) | (0.3899) | (0.4634) |
| | men | -0.8744 | -0.3427 | 0.3209 | -0.4983 | -0.8484 | 0.4981 | -1.4054 |
| | | (1.4493) | (0.8506) | (0.5908) | (0.8693) | (0.6213) | (0.7472) | (2.0036) |
| | pyramid | 1.7771** | 0.4083 | 0.6784* | 1.6668** | 1.4689** | 0.4300 | 2.0268** |
| | | (0.8444) | (0.3449) | (0.8707) | (0.7899) | (0.4197) | (0.4020) | (0.5089) |
| | class | -0.1410 | 0.7144* | 0.3840 | 0.4444 | 0.3829 | -0.0426 | 0.1246 |
| | | (0.6333) | (0.6865) | (0.6754) | (0.6593) | (0.2627) | (0.2616) | (0.3032) |
| | NE | -2.1980 | -1.1783 | -0.4634 | -0.4856 | -1.5136* | -0.4262 | -4.4152* |
| | | (1.6594) | (1.5485) | (1.7350) | (1.6777) | (0.4416) | (0.7577) | (0.5025) |
| | i_bright | -0.1115 | -0.0433 | | | | | 0.0498 |
| | | (0.1686) | (0.0415) | | | | | (0.2000) |
| | blue | 0.3438 | 1.2592*** | 1.3988*** | 0.6394 | 0.5016 | 0.6082 | 0.3316 |
| | | (1.2655) | (0.7102) | (1.4762) | (0.7540) | (0.4669) | (1.2398) | (0.8230) |
| | third | -2.1530 | 0.3245 | 0.1713 | -0.3079 | 0.2841 | -1.8632 | -0.6127 |
| | | (1.5387) | (1.3254) | (1.6079) | (0.6706) | (0.6369) | (1.2630) | (0.4587) |
| | carnival | 1.8624 | -0.1664 | 2.1488 | 1.5018 | 2.4099 | 1.6609 | 3.2201 |
| | | (1.5201) | (0.6060) | (0.5125) | (1.3955) | (0.4096) | (1.3656) | (0.4461) |
| | soccer | -0.9815 | -0.3157 | 0.0638 | -1.1284 | -0.6235 | -1.0840 | -0.6231 |
| | | (1.3889) | (0.5990) | (1.3798) | (1.2839) | (0.5689) | (1.2711) | (0.6500) |
| | Lula | 1.9833 | 0.9656 | 2.9832** | 1.4070* | 0.9978** | 1.1736* | 3.3851* |
| | | (1.3780) | (0.4448) | (0.5736) | (0.4462) | (1.5997) | (0.6685) | (2.0089) |
| | constant | 38.2321 | 28.9906* | 27.9809** | 7.3879** | 4.9379 | 14.9674 | 57.9235** |
| | | (24.5290) | (7.0544) | (3.8107) | (8.7182) | (5.1862) | (5.8073) | (29.5432) |

Table 13: to be continued…

Table 13: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Indian** | rgb_bright | -0.0805*** | | | | | | |
| | | (0.0245) | | | | | | |
| | chroma_bright | | -0.1515*** | | | | | |
| | | | (0.0448) | | | | | |
| | web_bright | | | -0.0524*** | | | | |
| | | | | (0.0183) | | | | |
| | pant_bright | | | | -0.0619*** | | | |
| | | | | | (0.0153) | | | |
| | ral_bright | | | | | -0.0436*** | | |
| | | | | | | (0.0163) | | |
| | html_bright | | | | | | -0.0845** | |
| | | | | | | | (0.0361) | |
| | logc_bright | | | | | | | -0.2452*** |
| | | | | | | | | (0.0632) |
| | educ | -0.0526 | 0.0423 | -0.7051* | -0.4347 | -0.0282 | -0.0440 | -0.2335* |
| | | (0.0814) | (0.0812) | (0.0754) | (0.1241) | (0.2984) | (0.1050) | (0.0876) |
| | vest_pr | -0.8606* | 0.0163 | -0.2290 | -0.4892 | -0.7581* | -0.5165 | 1.8893 |
| | | (0.4600) | (0.7475) | (0.8469) | (0.7257) | (0.4421) | (0.6788) | (5.5829) |
| | age | -0.0780** | -0.0582* | -0.3653* | -0.2193* | -0.2692* | -0.1998 | -0.3775** |
| | | (0.0358) | (0.0471) | (0.2027) | (0.1303) | (0.0455) | (0.1328) | (0.0615) |
| | men | 0.2335 | -1.4738 | -1.3855 | 0.3441 | -1.3722 | 0.0328 | 0.0889 |
| | | (0.6774) | (1.5384) | (0.7132) | (1.4224) | (0.8019) | (1.3187) | (0.6716) |
| | pyramid | 0.6189* | 0.7780* | 1.0641*** | 0.7398** | 0.4249 | 1.3473* | 0.8828** |
| | | (0.3694) | (0.8244) | (0.3470) | (0.3730) | (0.7397) | (0.3149) | (0.3932) |
| | class | 0.3338 | 0.3546 | 0.4657 | 0.3618 | 0.0019 | 0.3767 | 0.2414 |
| | | (0.2806) | (0.2931) | (0.2565) | (0.2686) | (0.3673) | (0.3497) | (0.4238) |
| | NE | -0.1617 | -0.2349 | -2.8981* | -2.1658 | -0.3253 | -1.4722* | -1.9583** |
| | | (0.4965) | (0.4775) | (0.4424) | (0.8339) | (0.8671) | (0.4517) | (0.8551) |
| | i_bright | -0.0581* | -0.0077 | | | | | 0.0772 |
| | | (0.0324) | (0.0150) | | | | | (0.0929) |
| | blue | 1.4028*** | 0.5577 | 0.0375 | 1.5928*** | 0.2514 | -0.0739 | -0.5174 |
| | | (0.5003) | (0.4847) | (0.4656) | (0.5245) | (1.3196) | (0.4762) | (1.7701) |
| | third | 0.4067 | -0.0166 | -0.0186 | 0.4135 | -2.4267 | 0.1838 | -0.1534 |
| | | (0.4379) | (0.5814) | (0.3911) | (1.3287) | (1.5589) | (0.4004) | (0.6935) |
| | carnival | -0.4271 | 1.3473 | -0.4389 | -0.5744 | -0.2653 | -0.1705 | -0.1813 |
| | | (0.4328) | (0.4216) | (0.4030) | (0.4299) | (1.6160) | (0.4126) | (2.1458) |
| | soccer | -0.6510 | -1.0427 | -0.4109 | -0.7871 | -1.0249 | -0.6179 | -1.8223 |
| | | (0.6283) | (0.7670) | (0.5469) | (0.6015) | (1.4389) | (0.7725) | (1.4483) |
| | Lula | 1.0125** | 0.9214** | 1.1149** | 0.9581** | 2.5291 | 2.0431 | 0.9653** |
| | | (0.4586) | (0.6428) | (0.4342) | (1.3990) | (0.4299) | (0.4240) | (0.7760) |
| | constant | 16.6021*** | 15.2929*** | 8.7509** | 16.4542* | 23.6254** | 19.9684*** | 17.6947 |
| | | (5.8757) | (5.5304) | (12.7440) | (4.9024) | (3.0030) | (10.0483) | (24.4028) |
| | Observations | 122 | 122 | 122 | 122 | 122 | 122 | 122 |

Standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

## *Table 14: Multinomial Probit Estimates – IBGE Classification – Part 4*

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| Black | rgb_bright | -0.2571*** | | | | | | |
| | | (0.0518) | | | | | | |
| | chroma_bright | | -0.2502*** | | | | | |
| | | | (0.0527) | | | | | |
| | web_bright | | | -0.1326*** | | | | |
| | | | | (0.0337) | | | | |
| | pant_bright | | | | -0.1499*** | | | |
| | | | | | (0.0287) | | | |
| | ral_bright | | | | | -0.1621*** | | |
| | | | | | | (0.0346) | | |
| | html_bright | | | | | | -0.1892*** | |
| | | | | | | | (0.0442) | |
| | logc_bright | | | | | | | -0.5956*** |
| | | | | | | | | (0.1244) |
| | educ | -0.3914** | -0.2888 | -0.1284 | -0.0241 | -0.4836* | -0.2369** | -0.0495 |
| | | (0.1709) | (0.1124) | (0.2993) | (0.2481) | (0.0791) | (0.2316) | (0.3182) |
| | vest_porp | 4.0842*** | 2.4263** | 1.2593* | 1.8491** | 2.5879** | 1.8414** | 2.5963* |
| | | (1.3048) | (0.9560) | (0.8921) | (0.8896) | (1.0651) | (0.9112) | (1.4956) |
| | age | -0.2174*** | -0.1283** | -0.0385 | -0.0602* | -0.1194** | -0.0906** | -0.2086*** |
| | | (0.0652) | (0.1370) | (0.0355) | (0.0474) | (0.1390) | (0.0425) | (0.1753) |
| | men | -0.9446 | -1.5430* | -1.0425 | -1.0099 | 0.1325 | -0.5358 | -2.5107 |
| | | (1.0051) | (0.6932) | (1.4909) | (0.6781) | (1.5168) | (0.5989) | (0.9765) |
| | pyramid | 1.5352*** | 1.1748 | 1.8244** | 1.2401** | 0.9621** | 1.0708** | 1.6880*** |
| | | (0.5427) | (0.4333) | (0.4296) | (0.4821) | (0.3314) | (0.6976) | (0.8752) |
| | class | -0.0296 | 0.6856** | 0.3911 | 0.0510 | 0.4772 | 0.4775 | 0.5365* |
| | | (0.4414) | (0.3933) | (0.3222) | (0.3872) | (0.6116) | (0.6150) | (0.7749) |
| | NE | -2.0718* | -1.1434 | -0.8983 | -1.8193** | -2.9042 | -1.5521 | -1.0356* |
| | | (1.1751) | (0.7825) | (0.6182) | (0.5018) | (1.9640) | (1.3620) | (2.2596) |
| | i_bright | -0.0349 | -0.0301 | | | | | 0.0960 |
| | | (0.0488) | (0.0210) | | | | | (0.1531) |
| | blue | -0.5829 | -0.1532 | 0.0975 | 0.5364 | 1.3841*** | 1.0976** | 1.7141*** |
| | | (1.0220) | (1.2926) | (0.6719) | (1.2479) | (0.7959) | (0.7342) | (0.5572) |
| | third | -0.1623 | -1.4152 | -2.1013 | -1.6563 | -0.1802 | -0.3586 | -3.3276* |
| | | (0.7887) | (0.4274) | (0.5200) | (0.4272) | (0.4146) | (0.6067) | (1.8101) |
| | carnival | -0.0474 | 0.2379 | -0.1102 | -0.1819 | 0.3889 | 0.1708 | 0.2615 |
| | | (0.7709) | (1.3633) | (1.4536) | (0.6659) | (0.6455) | (0.5956) | (0.7273) |
| | soccer | -1.4382 | -0.7610 | -0.5245 | -0.9017 | -1.5179 | -0.9719 | -0.7574 |
| | | (1.0837) | (1.1996) | (0.7621) | (0.9710) | (0.8777) | (0.5791) | (0.9711) |
| | Lula | 2.0337** | 1.8738 | 1.0975* | 2.2188 | 1.2497* | 0.9126** | 1.1183 |
| | | (0.8508) | (1.3418) | (1.4061) | (0.7348) | (0.7000) | (1.3708) | (0.4879) |
| | constant | 36.9491*** | 29.9370*** | 2.0911 | 17.2734*** | 18.2231*** | 7.4573* | 56.4922*** |
| | | (10.2981) | (13.2566) | (2.3391) | (2.4970) | (9.3530) | (4.4301) | (12.5043) |

Table 14: to be continued…

Table 14: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| **Brown** | rgb_bright | -0.1319** | | | | | | |
| | | (0.0542) | | | | | | |
| | chroma_bright | | -0.1713** | | | | | |
| | | | (0.0803) | | | | | |
| | web_bright | | | -0.1299** | | | | |
| | | | | (0.0545) | | | | |
| | pant_bright | | | | -0.0662* | | | |
| | | | | | (0.0355) | | | |
| | ral_bright | | | | | -0.1094** | | |
| | | | | | | (0.0492) | | |
| | html_bright | | | | | | -0.0843 | |
| | | | | | | | (0.0687) | |
| | logc_bright | | | | | | | -0.4459*** |
| | | | | | | | | (0.1399) |
| | educ | -0.4828* | -0.1502 | -0.0220 | -0.2415* | -0.2051* | -0.3570 | -0.6005* |
| | | (0.2730) | (0.2284) | (0.0985) | (0.0812) | (0.1200) | (0.0779) | (0.1561) |
| | vest_porp | 2.8732** | 1.4607* | 2.5984** | 2.6870** | 2.5700* | 1.8335 | 1.6899* |
| | | (1.3911) | (0.7877) | (0.7397) | (1.3170) | (1.3408) | (0.7356) | (0.8898) |
| | age | -0.3025** | -0.2287* | -0.0354 | -0.1112** | -0.0495 | -0.0441 | -0.0789* |
| | | (0.1519) | (0.0361) | (0.0292) | (0.0328) | (0.0321) | (0.0309) | (0.0403) |
| | men | -1.2620 | -0.4265 | 0.2865 | -0.6524 | -1.1491 | 0.5077 | -1.1904 |
| | | (1.4545) | (0.8798) | (0.5956) | (0.9108) | (0.6243) | (0.7595) | (1.8772) |
| | pyramid | 1.8350** | 0.4544 | 0.7175** | 1.6163** | 1.4490** | 0.4775 | 2.2891*** |
| | | (0.8285) | (0.3444) | (0.7611) | (0.7468) | (0.4379) | (0.4191) | (0.5691) |
| | class | -0.0429 | 0.8884** | 0.4001 | 0.5648 | 0.3856 | 0.0912 | 0.4084 |
| | | (0.6243) | (0.6429) | (0.6380) | (0.6228) | (0.2630) | (0.2635) | (0.3224) |
| | NE | -2.1042 | -1.2369 | -0.4928 | -0.5842 | -1.6150* | -0.4702 | -3.9256* |
| | | (1.6540) | (1.5168) | (1.5868) | (1.5337) | (0.4473) | (0.7742) | (0.5286) |
| | i_bright | -0.1143 | -0.0286 | | | | | 0.0703 |
| | | (0.1618) | (0.0360) | | | | | (0.2371) |
| | blue | -0.2922 | 1.2753*** | 1.3750*** | 0.0288 | 0.0210 | 0.1594 | 0.0757 |
| | | (1.3156) | (0.7681) | (1.4139) | (0.8437) | (0.4753) | (1.1289) | (0.9375) |
| | third | -1.9006 | 0.2807 | 0.1276 | -0.3866 | 0.2676 | -1.6273 | -0.5057 |
| | | (1.4113) | (1.1069) | (1.3165) | (0.6899) | (0.6602) | (1.1478) | (0.4965) |
| | carnival | 1.8187 | -0.1916 | 1.8810 | 1.3715 | 2.3176 | 1.6345 | 3.1485 |
| | | (1.5396) | (0.6113) | (0.5260) | (1.3876) | (0.4108) | (1.3567) | (0.4585) |
| | soccer | -0.6904 | -0.3278 | 0.1423 | -0.9759 | -0.6316 | -0.9503 | -0.9816 |
| | | (1.4113) | (0.6029) | (1.2643) | (1.2611) | (0.5693) | (1.2220) | (0.6703) |
| | Lula | 2.0344 | 0.9490 | 2.7534* | 1.4048* | 0.9493** | 1.3138** | 3.1475 |
| | | (1.4045) | (0.4482) | (0.5840) | (0.4482) | (1.6272) | (0.6694) | (1.9583) |
| | constant | 35.3825 | 24.7648* | 18.1985* | 4.8639* | 2.6421 | 12.8705 | 50.0814 |
| | | (24.0055) | (7.1947) | (3.5596) | (7.2183) | (4.9333) | (5.7039) | (33.4613) |

Table 14: to be continued…

Table 14: continued

| | | [1] | [2] | [3] | [4] | [5] | [6] | [7] |
|---|---|---|---|---|---|---|---|---|
| | rgb_bright | -0.0849*** | | | | | | |
| | | (0.0251) | | | | | | |
| | chroma_bright | | -0.1664*** | | | | | |
| | | | (0.0469) | | | | | |
| | web_bright | | | -0.0534*** | | | | |
| | | | | (0.0185) | | | | |
| | pant_bright | | | | -0.0641*** | | | |
| | | | | | (0.0155) | | | |
| | ral_bright | | | | | -0.0438*** | | |
| | | | | | | (0.0162) | | |
| | html_bright | | | | | | -0.0887** | |
| | | | | | | | (0.0373) | |
| | logc_bright | | | | | | | -0.2653*** |
| | | | | | | | | (0.0666) |
| | educ | -0.0496 | 0.0392 | -0.5542* | -0.3933 | -0.0288 | -0.0408 | -0.3730** |
| | | (0.0823) | (0.0831) | (0.0763) | (0.1328) | (0.2763) | (0.1088) | (0.0947) |
| | vest_porp | 1.8234** | 2.6801*** | 2.3662*** | 3.2884*** | 1.4982* | 1.0514 | 3.2708*** |
| | | (0.8999) | (1.2302) | (1.2911) | (1.1300) | (0.8561) | (1.1486) | (1.1964) |
| | age | -0.0759** | -0.0644* | -0.2837* | -0.1971 | -0.2631* | -0.1927 | -0.3887** |
| | | (0.0359) | (0.0516) | (0.1609) | (0.1243) | (0.0471) | (0.1267) | (0.0712) |
| **Indian** | men | 0.2446 | -1.7039 | -1.4578 | 0.3560 | -1.4982 | -0.0999 | -0.0791 |
| | | (0.6864) | (1.4867) | (0.7550) | (1.3859) | (0.8320) | (1.2705) | (0.6858) |
| | pyramid | 0.6867* | 0.9116** | 1.1361*** | 0.7842** | 0.4502 | 1.3038* | 1.0845** |
| | | (0.3757) | (0.7245) | (0.3497) | (0.3746) | (0.7090) | (0.3184) | (0.4290) |
| | class | 0.3479 | 0.5122 | 0.6217* | 0.3762 | 0.0803 | 0.3799 | 0.4788 |
| | | (0.2842) | (0.3066) | (0.2589) | (0.2716) | (0.3735) | (0.3512) | (0.4377) |
| | NE | -0.1959 | -0.2333 | -2.4779 | -1.9181 | -0.3466 | -1.4243* | -2.4348** |
| | | (0.5054) | (0.4862) | (0.4482) | (0.8617) | (0.9065) | (0.4557) | (0.9995) |
| | i_bright | -0.0590* | -0.0043 | | | | | 0.0902 |
| | | (0.0330) | (0.0152) | | | | | (0.1106) |
| | blue | 1.3670*** | 0.1460 | -0.2152 | 1.5959*** | -0.0591 | -0.3564 | -0.7304 |
| | | (0.5058) | (0.4917) | (0.4699) | (0.5316) | (1.3062) | (0.4773) | (1.6806) |
| | third | 0.4565 | 0.0171 | 0.0371 | 0.3944 | -2.0554 | 0.1882 | -0.4800 |
| | | (0.4473) | (0.5966) | (0.3920) | (1.2107) | (1.3553) | (0.4021) | (0.7385) |
| | carnival | -0.4480 | 1.3343 | -0.4183 | -0.5722 | -0.2410 | -0.1737 | -0.1186 |
| | | (0.4381) | (0.4267) | (0.4033) | (0.4327) | (1.6076) | (0.4135) | (2.1016) |
| | soccer | -0.6431 | -0.7750 | -0.3986 | -0.8134 | -1.0201 | -0.6265 | -1.6900 |
| | | (0.6314) | (0.8114) | (0.5459) | (0.6055) | (1.3617) | (0.7978) | (1.4040) |
| | Lula | 0.9591** | 0.8741* | 1.0585** | 0.9070** | 2.5582 | 2.0149 | 0.7792 |
| | | (0.4616) | (0.6485) | (0.4335) | (1.3917) | (0.4308) | (0.4247) | (0.7936) |
| | constant | 14.4607*** | 14.3770*** | 9.7954*** | 11.0421 | 18.6522** | 21.1395*** | 16.2482 |
| | | (5.5164) | (5.3852) | (9.5364) | (4.4507) | (2.5677) | (9.6294) | (21.8715) |
| | Observations | 122 | 122 | 122 | 122 | 122 | 122 | 118 |

Standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

## Annex

### *Annex 1: Aggregation of Open Classification Terms*

| | **Open Classification Agregation** | |
|---|---|---|
| **Brazilian spontaneous Terms** | $\mathbf{C_{open1}}$ | $\mathbf{C_{open2}}$ |
| *branca* | White | White |
| *branca morena* | White | Morena |
| *branca parda* | White | White |
| *branca caucasiana* | White | White |
| *morena* | Brown | Morena |
| *morena clara* | Brown | Morena |
| *morena negra* | Black | Morena |
| *morena amarela parda* | Yellow | Morena |
| *índia morena* | Brown | Morena |
| *amarela* | Yellow | Yellow |
| *parda* | Brown | Brown |
| *parda amarela* | Yellow | Brown |
| *parda negra* | Black | Black (*negra*) |
| *negra* | Black | Black (*negra*) |
| *preta* | Black | Black (*preta*) |
| *escura preta* | Black | Black (*preta*) |

Source: Cassilde's field research data.

### *Annex 2: Correlations Between Hue Colors and Future Explained Variables*

| | **occupation** | **educational level (in years)** |
|---|---|---|
| **rgb_bright** | - 0.1368 | 0.0413 |
| **chroma_bright** | - 0.1650 | 0.0823 |
| **web_bright** | 0.0435 | 0.0620 |
| **pant_bright** | - 0.1034 | 0.0681 |
| **ral_bright** | - 0.0885 | 0.0430 |
| **html_bright** | - 0.0371 | - 0.1099 |
| **logc_bright** | - 0.1749 | - 0.0246 |

Source: Cassilde's field research data.