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Larissa Giardini Simões

**GENDER DYNAMICS IN BRAZILIAN HOUSEHOLDS AND LABOR  
MARKET: evolving roles and persistent inequalities**

Belo Horizonte

2023

Larissa Giardini Simões

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MARKET: evolving roles and persistent inequalities**

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**LARISSA GIARDINI SIMÕES (MATRÍCULA Nº 2018651433)**

**GENDER DYNAMICS IN BRAZILIAN HOUSEHOLDS AND LABOR MARKET: EVOLVING ROLES AND PERSISTENT INEQUALITIES**

Tese apresentada ao Programa de Pós-Graduação em Economia da Faculdade de Ciências Econômicas da Universidade Federal de Minas Gerais para obtenção do Título de Doutora em Economia, área de concentração em Economia Aplicada.

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*À minha vo, cujos ensinamentos sobre  
empoderamento de genero foram práticos e valiosos.*

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Essa jornada que por um lado é tão individual e solitária, por outro só é possível estando entre mentes inquisitivas e corações generosos. It takes a village.

Quando nasci um anjo esbelto,  
desses que tocam trombeta, anunciou:  
vai carregar bandeira.  
Cargo muito pesado pra mulher,  
esta espécie ainda envergonhada.  
Aceito os subterfúgios que me cabem,  
sem precisar mentir.  
Não tão feia que não possa casar,  
acho o Rio de Janeiro uma beleza e  
ora sim, ora não, creio em parto sem dor.  
Mas, o que sinto escrevo. Cumpro a sina.  
Inauguro linhagens, fundo reinos  
— dor não é amargura.  
Minha tristeza não tem pedigree,  
já a minha vontade de alegria,  
sua raiz vai ao meu mil avô.  
Vai ser coxo na vida, é maldição pra homem.  
Mulher é desdobrável. Eu sou.

**Com licença poética - Adélia Prado**

Do livro Bagagem. São Paulo: Siciliano, 1993. p. 11



## RESUMO

No Brasil, o processo de aumento da participação feminina no mercado de trabalho e a adoção de novos papéis pelas mulheres resultam na prevalência de jornadas de trabalho duplas na rotina das trabalhadoras. Apesar das mudanças em direção da igualdade de tempo de trabalho doméstico entre homens e mulheres, ainda persistem diferenças na alocação do tempo. Outra mudança é a tendência de maior igualdade nos ganhos entre os cônjuges em todo o mundo. A dupla jornada de trabalho feminina reforça a inserção ocupacional e padrões de transição ocupacional segmentados. Essa tese utiliza a família como fio condutor para investigar a desigualdade de gênero nos domicílios e no mercado de trabalho brasileiro, considerando também dimensões da estratificação social e demografia. O primeiro artigo explora o impacto da estrutura familiar e das características ocupacionais no tempo dedicado ao trabalho remunerado e não remunerado. Observa-se um padrão tradicionalista de uso do tempo, uma vez que, por exemplo, ter um parceiro no domicílio aumenta mais o trabalho doméstico da mulher do que um filho/filha. O trabalho doméstico das mulheres é significativamente influenciado pelo status sócio-ocupacional e pela composição do domicílio, enquanto o status sócio-ocupacional dos homens não tem tanto peso em comparação à estrutura do domicílio. As ideologias de gênero falam mais alto do que as diferenças e desigualdades sociais e demográficas de casais e famílias na delegação do trabalho doméstico às mulheres. O segundo trabalho aborda a associação de rendimentos de casais heterossexuais em diferentes faixas de renda e ao longo do tempo. Entre 1995 e 2019, a tendência de igualdade está mais relacionada com uma redução da disparidade salarial em favor dos homens ou aumento nos casos de equiparação salarial do que com o aumento da frequência de mulheres com rendimento superior aos de seus parceiros. A tendência de maior igualdade de rendimentos vai até as mulheres ainda ganharem menos que seus parceiros. Esta norma é mais flexível entre os mais pobres, padrão que provavelmente emerge da necessidade econômica e não de mudança nas atitudes de gênero. O terceiro artigo analisa a mobilidade ocupacional, enfatizando a intensidade ocupacional de gênero das ocupações e a estrutura familiar dos trabalhadores. Identifica-se um padrão de gênero nas transições ocupacionais já que, por exemplo, há maior redução da frequência das transições para ocupações não típicas de gênero entre mulheres do que homens. Além disso, a frequência das transições das mulheres para ocupações masculinas diminuíram mais rapidamente do que o movimento deles para ocupações femininas entre 2012 e 2019. No geral, as mudanças ocupacionais reduzem a segregação de gênero, especialmente as realizadas por mulheres, contudo, esse padrão não é claro e não parece intensificar-se ao longo dos anos. A contribuição deste trabalho é identificar um conjunto de transformações de gênero que são desiguais; acontecem mais entre as mulheres do que entre os homens, mais no local de trabalho do que em casa, e de forma diferente entre os grupos socioeconômicos, e estagnadas.

Palavras-chave: divisão do trabalho, trabalho doméstico, estrutura familiar, igualdade de gênero, desigualdade de rendimentos, gap salarial de gênero, segregação, composição ocupacional por gênero, mobilidade ocupacional, Brasil

## ABSTRACT

In Brazil, there has been a process of increasing female participation in the labor market by women taking on new roles. The rise in female labor force participation leads to a prevalence of double shifts in women's daily routines. Although there has been a change towards more equal housework times among men and women, gender differences in time allocation remain. Another change is a trend toward more equal earnings among spouses worldwide. Female double burden influences women's unequal occupational placement, which tends to be in occupations that accommodate that kind of work journeys and their transition between occupations. This dissertation employs the family as a guiding thread for studying gender inequality in Brazilian households and labor market. Also, social stratification and demographic angles are applied to examine distortions and inequalities faced by women in the domestic and work realms. The first paper explores the effects of family structure and occupational characteristics on time spent on market and non-market work. There is still a traditionalistic pattern of time use since, e.g., having a male partner the household increases a woman's housework more than a son/daughter. Women's housework is significantly influenced by their socio-occupational status and the household composition, while male occupational status does not carry as much weight compared to the household structure. Gender ideologies in the delegation of domestic work to women speak louder than the social and demographic differences and inequalities that couples and families have. The second focuses on the earnings association of heterosexual couples across different income levels and how it has evolved. Between 1995 and 2019, the trend toward equality is more related to reducing the wage gap in favor of men and even increasing the cases of wage matches, than to the frequency rise of women outearning their partners. There is a trend towards greater income equality up to a certain point, where women still earn less than their husbands. This norm is more flexible among the poorest, possibly emerging from economic need rather than evolving gender attitudes. The third paper analyzes occupational mobility, emphasizing the occupational gender intensity of the occupations and the family structure of the movers. There is a gendered pattern in the occupational transitions, e.g., over time, there has been a stronger reduction in the transitions outside a worker's gender-dominant occupation for women than to men, and the frequency of women's changes to male occupations decreased more rapidly than their movements to female ones between 2012 and 2019. Overall, occupational transitions act to reduce gender occupational segregation, especially the ones performed by women. However, the pattern is not clear and does not appear to intensify over the years. This work contribution is drawing a picture of a set of changes in the gender system that are uneven; they happen more among women than men, more in the workplace than at home, and differently among socio-economic groups, and stalled.

Keywords: division of labor, housework, household structure, gender equality, earnings inequality, gender wage gap, segregation, occupational gender composition, occupational mobility, Brazil

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## INTRODUCTION

Less frequent and delayed marriages, a rise in female labor force participation, and low fertility are some changes in gender relationships that represent the gender revolution. This phenomenon occurs in the public sphere, with women emerging out of the home and taking new roles as providers for their families, and private ones, especially with the demographic changes that reshaped the female life course, allowing women to undertake new roles. The gender revolution can be conceptualized in two parts; the first part focuses on changes in the labor market, particularly the rise in women's labor market participation, while the second part examines changes in men's behavior and increased male involvement in the private sphere (Goldscheider et al., 2015; England, 2010).

In Brazil, increasing female participation in the labor market took off in the 1970s, driven by social, cultural, and economic factors such as urbanization and economic growth (Bruschini, 2007; Wajnman et al., 1998). Education, changing aspirations, shifts in family structures, and new identifications of gender roles drove and sustained these transformations. Concurrently, macroeconomic factors increased worker demand, facilitating female entry into the labor market.

Separation of the public and private spheres is a byproduct of industrialization, relegating women to the private sphere and men to the public. This dominant force structured gender relationships for approximately a century until that structure began to decline. Initially, women entered the public sphere as co-breadwinners in their families, adding new roles but staying on as the primarily responsible for the care; "most working women even took satisfaction in being able to do both, not perceiving their high share of housework as unfair" (Goldscheider et al., p. 216, 2015). Eventually, men were also supposed to assume their role in the private sphere as co-nurturers and caregivers in the family. However, significant pressure for change in the private sphere is very recent (Goldscheider et al., 2015).

The process of women taking on new roles is related to demographic changes that reshaped their life course, coinciding with an increasing demand for women's paid labor. This led to a rise in female labor force participation and the prevalence of the "second shift" added to women's daily routines (Goldscheider et al., 2015). Most changes in the gender system are related to women occupying positions and performing activities previously limited to men; few changes in the opposite direction are observed (Bianchi, 2016). The counterpart of the change is the inclusion of

men in the private sphere of the family by increasingly assuming their share in the domestic tasks. Although there is evidence of this change being underway in several countries, it has been slow, and the increase in male time in housework has a long way to go to catch up with female housework loads (Cherlin, 2016; Goldscheider et al., 2015).

The asymmetric change in women's and men's roles is the primary reason why this set of transformations, in course since the second half of the XX century, has been called uneven and stalled. Besides that, these changes affected some groups more than others, as less change took place in the working class than in the middle and upper-middle classes. Also, these modifications happened more in some dimensions of life than others, specifically in work and education, and less in familiar and personal relationships (England, 2010; England, 2016).

Although women have reduced the amount of time spent on housework and men have increased their hours in housework and childcare over the past several decades, gender differences in time allocation remain. This trend is observed in both developed and developing countries (Bianchi et al., 2000) and is ubiquitous among the great diversity of family arrangements (Zhou & Kan, 2019). The unequal distribution of unpaid or reproductive work represents a double burden that profoundly impacts women's work patterns throughout their family life cycle.

Another change identified in recent literature is a trend toward more equal earnings among spouses in various parts of the world (Esping-Andersen, 2007; Schwartz, 2010; Gonalons-Pons & Schwartz, 2017). The increase in "positive sorting in earnings" is also related to the trends in female participation in the labor force, as well as other social and demographic changes like postponing unions, falling fertility, and increasing educational levels (Greenwood et al., 2014; Pestel, 2017; Shen, 2021). Economic homogamy may also come from changes in family organization that alleviate the pressure of the double shift among women, such as intergenerational households. Nevertheless, the gender wage gap persists (Blau & Kahn, 2017). In addition to factors related to gender segregation in educational fields and labor market segmentation, the gender differences in the allocation of domestic work and family responsibilities are related to the pay gap and persistent gender income imbalance among couples. An individual's earnings reflect productivity and the endogenous joint decision-making of labor supply at the couple level (Bredemeier & Juessen, 2013). Therefore, when the shift from single-earner to dual-earner family arrangements coincides



with a more equal, or less unequal, division of household chores, women have more time available to "climb the occupational ladder".

Even after conquering space in the labor market, the unequal burden carried by women, who are still responsible for most of the work at home, influences the unequal occupational placement of women, who tend to be in occupations that can accommodate this double journey (Bruschini, 2007). Thus, gender inequalities persist in the labor market, particularly in earnings and occupational segregation. Female-dominated occupations yield lower returns, even after controlling for human capital and other factors such as race, household composition, or job-related characteristics, exacerbating the gender pay gap (Salardi, 2013). Besides differences in occupational placement, men and women transition between occupations or occupational categories differently (Dex & Bukodi, 2013). Throughout the family life course, the double burden can profoundly impact mothers' work patterns, as women are more likely than men to interrupt employment during periods of high family demands, often working part-time or engaging in less demanding occupations (Stier et al., 2018).

This dissertation employs the family as a guiding thread for studying gender inequality in Brazilian households and the labor market, investigating ramifications for both society and women of family structure and composition. Besides that, social stratification and demographic angles are applied to examine distortions and inequalities women face in the domestic and work realms. Beyond this introduction, the thesis consists of three independent studies, each contributing to understanding gender inequality in private and public spheres.

The first paper analyzes the occupational mobility of Brazilian workers, emphasizing the occupational gender intensity of the occupations and the family structure of the movers. The second focuses on the earnings association of heterosexual couples across different income levels and how it has evolved. The third paper explores the effects of family structure and occupational characteristics on time spent on market and non-market work. All three papers focus on the Brazilian population, portraying, in summary, a picture that matches the one of an uneven and stalled gender revolution.

The first paper reveals the existence of a gendered pattern in the occupational transitions of Brazilian workers. When women change their occupations, they are more likely to enter a predominately male occupation, indicating their role in overcoming gender divisions in the labor

market. However, over time, there has been a more significant reduction in transitions outside one's gender-dominant occupation for women than men, and the frequency of women's changes to male occupations decreased more rapidly than their movements to female ones between 2012 and 2019. As expected, being in an occupation typical of a worker's gender increases their stability. However, occupational transitions usually preserve the worker's type of gendered inclusion (for example, if a woman is not in a female occupation, there is a smaller probability of moving to a female occupation). That happens especially for men, a segregation perpetuation mechanism that is stronger for men than women. Overall, occupational transitions act to reduce gender occupational segregation, especially the ones performed by women. However, this pattern is unclear and does not appear to be intensifying over the years, possibly influenced by a conservative reaction to the progressive diffusion of gender ideals.

Regarding the spouses' relative income, the second paper identifies a trend towards greater income equality up to a certain point, where women still earn less than their husbands. The glass ceiling is present in the occupational ladder and at home (Bertrand et al., 2015). When looking at the wage association of double-earning partners in 1995 and 2019, the trend toward equality is more related to reducing the wage gap in favor of men and increasing the cases of a wage match than to a rise in cases of women outearning their partners. The norm of the man as the household's primary breadwinner seems to limit the equalizing change in the families, also by shaping women's labor offer. This norm is more flexible on the low end of income distribution, and the poorest individuals exhibit more diverse income distribution associations. A more significant share of wives as the primary earners in this income level arises from economic necessity rather than evolving gender attitudes.

The findings in the third work confirm a very traditionalistic pattern of time use. For example, having a male partner in the household increases a woman's housework more than a son/daughter, even when factors like age, status in the household, and education have already been considered. Furthermore, a woman's time spend on chores and care is significantly influenced by her socio-occupational status and who she shares her household with. Regardless of household composition, the lower the women's status, the more time is allocated to chores, and the same happens, regardless of occupational type, to women who live with their partners and children. That result does not hold for men, whose occupational status carries less weight than the household structure. In that case,

the most significant difference is between men living alone and the other living arrangements, i.e., the presence of someone to relegate that work. The gender ideologies in delegating domestic work to women speak louder in Brazilian households than the social and demographic differences and inequalities between couples and families.

As a whole, the findings paint a picture of a gender revolution in Brazil that progressed rapidly but remained highly uneven and hit several limitations. Being a woman is still the most critical factor defining how much time a Brazilian person spends on housework. The gap between the incomes of male and female partners is decreasing, but it is still about as unlikely as before that a woman earns more than her husband. Women have been progressively finding more space in male-dominated occupations, but this movement has been slowing down instead of speeding up in recent years.

These asymmetric and, in a sense, shy transformations in Brazil can be understood in light of the possible explanations for the delay of the second half of the gender revolution provided by Goldscheider et al. (2015).

“Many factors are involved, but most fundamentally, if the public sphere has historically been a “male” place, the family has been even more a “female” place. In the terminology of the separate spheres, even though employment was “unwomanly,” childcare and housework were for a long time far more “unmanly.” Goldscheider et al., (2015).

They point out that while women had some experience in the labor market before marriage or the birth of their first children, and increased education preceded women's labor force participation, men had little preparation for domestic roles.

However, this argument does not consider that these activities are part of everyone's life since birth. Even if individuals are not producing, they are recipients of reproductive work since every person needs it to some extent to stay alive. On the other hand, England (2010) highlights men's lack of commitment to egalitarian behavior, stemming from the continued absence of cultural or institutional appreciation for traditionally female activities. This disincentive for men to engage in gender-nontraditional activities and occupations can be at the root of the asymmetrical change.

Overall, this dissertation captures trends in time use, family dynamics, and work patterns in Brazil that contribute to our understanding of these important characteristics of our changing society. Raising questions and identifying possible answers is fundamental to creating a more equal and

fair gender structure both at work and in the household. Women and men can benefit from understanding the social dynamics where they have developed their values and attitudes. At the same time, that can help the development of family policies that do not facilitate the reconciliation of work and family life by accommodating women's double burden and alleviating males' role. The contribution of this work is also in the sense of extending literature for the country since research on these topics still needs to be improved for Latin America and, specifically, Brazil.

Besides the individual contributions highlighted and discussed in each paper, this thesis contributes to the broader literature on gender inequalities by pointing to limits and boundaries for the improvements in asymmetries of gender relations. Framing these improvements as part of a Gender Revolution allows empirical insights into their shortcomings, as the pace and nature of changes in men's and women's worlds are fundamentally different. In that sense, this work offers a Brazilian perspective and contributes to situating the country in terms of changing women's and men's roles, the gendered divide, and persistent inequality.

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## **STUDY 1 - GENDER AND TIME ALLOCATION IN BRAZIL: THE INFLUENCE OF FAMILY STRUCTURE ON PAID AND UNPAID WORK TIME**

### **ABSTRACT**

There has been an increase in women's schooling and labor market participation in recent decades, however, little progress has been made in redistributing the traditionally female work. Frequently, second shifts are added to the women's routine, indicating the persistent gender differences in time allocation. This study investigates the allocation of time between paid and unpaid work among Brazilian women and men, focusing on individual and occupational characteristics and family structure. Using censored bivariate regression models applied to 2019 data, the decision to allocate time between unpaid work and paid work is considered simultaneously, as it addressed the large presence of zeros on the dependent variable. Results reveal a very traditionalist pattern of time use, also influenced by the household composition. Having a male spouse, for instance, increases a woman's domestic workload more than the presence of sons and daughters, while their presence reduces a man's time spent on domestic work while increasing his paid work hours. Education also has distinct effects by gender. Women with higher education levels tend to spend less time on domestic work, while the opposite is true for men with higher education. Furthermore, women in higher socio-occupational categories perform fewer domestic activities. The time a woman spends on paid work and housework is influenced by both her occupational and household characteristics. For men, their socio-economic status does not carry as much as household structure, specifically the presence of a woman in the household. That is, the gender ideologies in the delegation of domestic work speak louder than the social and demographic differences and inequalities between couples and families. Regardless of the great diversity in household arrangements, a common feature is the unequal division of unpaid domestic work among women and men.

Keywords: division of labor, housework, household structure, gender equality, Brazil

### **1 INTRODUCTION**

Recent events, such as the COVID-19 pandemic and the need for social distancing, exacerbated many of the conflicts already existing in interpersonal relationships and society. The distinction between public and private spheres, or life and work, was blurred for part of the population, and the public sphere invaded households. At the same time, several agreements and arrangements had to be realigned as support systems that helped reconcile work with personal life, such as domestic worker services, daycare centers, etc., were discontinued. Many of these emerging issues

increasingly became part of public discussions, as people had to renegotiate tasks and reorganize their time while also facing challenges in the work sphere. The pandemic highlighted the inequality between men and women and between different household structures in care demands, while there was some equality in the work demands.

Despite the increase in women's schooling and labor market insertion that has occurred in recent decades, little progress has been made in redistributing women's roles in the traditional sexual division of labor. This has resulted in an asymmetry between men's and women's workload (England, 2010). The unequal division of work significantly negatively impacts women's labor patterns, which can be even greater for mothers, especially those caretakers of single-parent families (Zhou, 2017).

In recent decades, there has been an increase in the number of women entering the labor market, and male and female participation rates have nearly converged. This trend has coincided with changes in family structures, such as the growing employment of mothers, instability in families and single-parent households, population aging, and an increased burden of care for older people. These family changes are also correlated with changes in occupational trajectories and workplaces. Changes in the world of work include non-traditional working hours, which can be unfriendly to families, and part-time work, particularly among women (Bianchi, 2011).

However, "*these changes pose differing work-life issues for parents at different points along the distribution*" (Bianchi, 2011, p.15). For workers at the top of the pyramid, this dilemma relates to well-paying jobs involving long work shifts with few alternatives to this labor-intensive workday. For workers at the bottom of the pyramid, the work usually involves few hours and low pay, endangering the family's means of subsistence. Also, for these workers, there is usually little flexibility in scheduling, challenging the conciliation with the journey of caring for the children and other needs from personal life. In that sense, work and household dynamics across different income levels also represent different dilemmas in the work/family relationship (Bianchi, 2011).

Thus, this study investigates how men and women allocate their time to paid work and household chores and care based on their individual characteristics, household configuration and occupational status. Specifically, I examine the most common types of households in Brazil and how the division of work between men and women varies among them. I also explore how individual factors like age, education and household position are related to the time spent on paid and non-paid work.

Finally, factors such as socio-occupational status and type of labor insertion are investigated regarding their impact on domestic and paid workloads.

Time use is a crucial factor connecting work and family life, as it contributes to the persistence of traditional gender division of labor patterns. The unequal division of reproductive and care activities, often unnoticed, remains a barrier to gender equality. Women still bear the primary responsibility for domestic and family care tasks, which affects their access to market work and opportunities for professional advancement. It is essential to comprehend the dynamics of families and the interplay between household chores and paid work in households to develop and enhance policies that foster autonomy and equality for women.

This paper contributes to the debate on the gendered division of work and time use of couples by using a novel approach to the family role. A household classification that allows an operationalization of the hypothesis is executed, along with an overview of the composition of the Brazilian family. Also, innovation comes from investigating the ability of the family's interaction with occupational characteristics and socio-occupational status to explain the behavior of men and women regarding their work times. Furthermore, this work is an effort to situate the country in terms of the undergoing changes in women's and men's roles, the gendered divide, and persistent inequality.

Besides this introduction, this paper presents the theoretical background for the gendered work division in the household, along with a description of the Brazilian case. Then, the database used is the 2019 Continuous National Household (PNADC) survey is characterized, along with the methodology. The results presentation follows, beginning with the descriptive analysis of the types of households in Brazil today, along with their composition regarding gender, age, education, and position in the labor market, and, more importantly, the pattern of their time use among paid and unpaid work. Tobit regression models estimate the hours that an individual devotes to the household at the same time as the hours devoted to the labor market, as well as identify occupational status differences in time spent on chores. Finally, the paper is concluded with some final remarks.



## **2 THEORETICAL FRAMEWORK - GENDER, FAMILY, AND TIME USE**

Understanding how time is allocated to the labor market and to care and domestic work requires considering the family context. Mincer (1974) pioneered linking individual labor supply to decisions made jointly by the family. Currently, there are three fundamental lines of approach to understanding the allocation of domestic work: relative resources or bargaining, time availability, and gender perspective, with an additional life cycle perspective (Bianchi, 2011).

*i. Relative resources or bargaining* - Time allocation to household work reflects power relations between men and women based on the "relative resources" each partner brings to the relationship. Assuming that domestic work is undesirable, the partner with more resources can negotiate less time spent on this activity, transferring it to the other partner. Thus, the allocation of time to paid and unpaid work results from a conflict, and several variables influence one's bargaining power, including gender, race, education, income, and labor market performance. The latter is considered the greatest source of bargaining power (Killewald, 2011), highlighting the gendered nature of this dynamic since women have lower incomes on average and domestic work is more frequently attributed to them.

Empirical work partly confirms this theory: as a woman's income increases, absolutely or relative to her male partner, her time spent on chores decreases, but the same is not true for men (Pineiro, 2016). In that sense, this income increase does not necessarily translate into a new balance of power between individuals but rather suggests the possibility of outsourcing part of the chores and care to another woman, a domestic worker, or through the purchase of time-saving appliances and services.

*ii. Time availability* - The division of labor can also be understood as a rational allocation based on each person's availability for work and the number of activities that need to be performed. In that case, allocating time between paid and unpaid work results from economic rationality rather than conflict, like in the bargaining theory. This framework is based on Becker's (1965) argument of maximizing efficiency in the household division of labor, where asymmetries in allocating time between paid and unpaid work arise from comparative advantages among couples resulting from specialization. Women, mainly due to motherhood, have comparative advantages in domestic activities, increasing their presence in the domestic sphere and decreasing in the labor market. In other words, a rational decision on the couple's division of labor indirectly considers the gender

dimension. Family composition is also an important determinant of the time spent on household chores, either due to the demand side of these services and the needs of the household residents or by the existence of options to whom the unpaid work could be delegated.

Although this relationship between time spent on productive and reproductive, as preconized by the time availability theory, was identified in various empirical studies, women continue to be responsible for most of the reproductive work regardless of the increase in female participation in the labor market, income, and even education in recent years (Pineiro, 2016). This approach also cannot account for a large part of the variations in time spent on household work by women, providing limited tools for understanding gender inequalities. Also, rather than providing an explanatory theory for the allocation of time among different types of work, the time availability theory is more a description of the gender divisions of work phenomenon (McMunn et al., 2020).

*iii. Gender perspective* - Feminist theory strongly criticizes the previous two approaches, pointing out that domestic work is a symbolic act of gender relations, not governed by direct supply-demand relationships and rational choice. Domestic work remains primarily feminine, even with women entering the workforce, because it "*does not have a neutral meaning (...) its performance by men and women expresses gender relations existing in households, constructed socially and culturally*" (Pineiro, 2016, p.79). Gender ideologies have effects at various levels, generating norms and identities that cultivate the so-called *doing gender*, a byproduct of the division of domestic labor (Bianchi et al., 2000). Performing these activities shows not only to society but also to oneself that the individual is competent in their gender category and acts within expected standards.

Most of the contributions to the field of "gender ideology", i.e., the "*continuum in individual-level attitudes regarding the notion of 'separate spheres' in gender divisions of labour within couples*" (McMunn et al., 2020) are based on the dynamics between couples and gender role patterns in a union. Even if gender ideology is getting more egalitarian over time, this change is faster for women than for men and an unequal gendered division of work persists. In that case, fundamental social norms are the base that maintains traditional gender identities and the gendered division of work (McMunn et al., 2020).

*iv. Lifecycle perspective*: Aspects of the lifecycle are important for reproductive work, especially those involving the formation/dissolution of unions, age, family arrangements, and fertility. The lifecycle is also important for paid work since it determines the phases of life in which knowledge

is accumulated, the training phase, and retirement. As early as 1977, an extension of bargaining models was carried out by Smith to include a lifecycle approach in modeling the labor supply decisions of men and women in a household. This approach involved analyzing investment patterns in education, savings, and consumption at different ages and projecting labor supply for future years based on demographic projections.

Age, marital status, fertility, and status in the labor force are dimensions for operationalizing the lifecycle concept (Zuzanek & Smale, 2002). These demographic variables jointly produce better results. For example, age is more useful for understanding patterns of domestic work when analyzed according to the individual's gender and marital status. A transition, such as the birth of a child, significantly impacts women's time use but not men's. Another example is unions: men decrease the time spent on unpaid domestic work when entering unions and increase it on a dissolution; the opposite result is found for women (Pinheiro, 2016; Coltrane, 2000).

This approach is not incompatible with the gender perspective; on the contrary, it reinforces the need to consider the division of labor as a phenomenon with multiple dimensions. In addition, this framework embraces the diversity of forms of family (or household) by considering the individual and family lifecycle and their dynamic aspects.

*v. The Brazilian case:* Although no survey in Brazil produces specific time use data, since the 2000s the *Pesquisa Nacional por Amostra de domicílios* (PNAD) collected some information on commuting time and time spent on household chores, in addition to the paid workload that was already in the survey. Several studies have been carried out mainly using this information resource<sup>1</sup>.

Brazilian women work an average of 18 hours more per week than men, considering working hours in the market and extra-market in 2006. Women's total work hours tend to increase the more unstable and low-skilled their occupation is and the lower their income. Younger children also have

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<sup>1</sup> In 2016, a book titled "Time Use and Gender" was published, organized by Fontoura and Araújo, which presents a collection of articles on this topic. The work consolidated and organized the existing advances in this area. Pinheiro (2016) stands out, who reviews international and national studies on the determinants of time allocation in reproductive work, articulating theoretical developments with empirical results. Another collection of articles on the topic is "The Art of Weaving Time: Feminist Perspectives" organized by Melo and Moraes in 2021.

the effect of increasing the total workload when compared to those of men in a similar occupational and family situation (Dedecca et al., 2009).

Considering only the paid work, the individual female life cycle, through events such as marriage, motherhood, and family building, acts to reduce women's labor supply, both regarding the decision to participate in the labor market and the number of hours to be offered (Queiroz & Aragón, 2015). The presence of small children in the household greatly impacts the number of housework done by a woman, as also happens with the presence of other parents, potential demanders of care. However, living with children older than 14 means a reduced housework workload, indicating a transfer of duties to them (Garcia et al., 2022). On the other hand, other societal changes and tendencies contribute to increasing women's participation in the labor market, such as schooling and access to daycare centers, etc. (Queiroz & Aragón, 2015).

The presence of relatives in the household positively affected unburdening women until 1996. Still, this effect decreased and ceased to be significant in 2006, and having a relative at home was no longer necessary for women to work, either because of the growth in the supply of services or because of lower fertility. Socio-economic status is also a feature in the process of gender division of work since it influences the possibility of delegating such activities by hiring paid domestic helpers and contracting the services of daycare centers, for example (Garcia et al., 2022). This adds to opportunities like access to social rights and maternity leave, which are already asymmetrically experienced in the labor market by workers (Itaboraí, 2016).

In addition to the other inequalities, men enjoy more leisure hours than women, even though this gap has been shrinking over the last decades. An increase in the time dedicated to leisure is found for both genders, explained in the male case by the significant reduction in the hours worked in the market, while in the female case, the gain of seven weekly hours of leisure is due to the reduction in the hours dedicated to household chores (Barbosa, 2018).

Inequality in the distribution of time use exists not only between men and women, but also within each gender group. Approximately half of women and men do not experience the burden of double work shifts; men generally do not engage in regular housework, while many women are inactive in the labor market. When the double shift occurs, the composition of their double workdays differs significantly. The high inequality within each group mainly results from whether people work or not, indicating a significant level of polarization (Medeiros & Pinheiro, 2018).

It is important to point out that, according to Jesus et al. (2021), the lack of detail in the questionnaire of the main survey used for work on the topic in Brazil leads to underreporting the hours dedicated to childcare. An indirect standardization is used to correct the Brazilian data, and it is reinforced that women, after childhood, spend practically the entire life course as net transfers of unpaid domestic work. Once again, significant differences by social class emerge, with women in the lowest income decile becoming net providers of domestic labor as early as 13 years old. In comparison, those in the highest decile start at 23 years old. On the other hand, men consume more domestic labor than they produce throughout their entire life course, regardless of income level.

### **3 DATA, VARIABLES, AND METHODS**

#### 3.1 Database and variables

The database used in this study is the Continuous National Household Sample Survey (PNADc) from the Brazilian Institute of Geography and Statistics (IBGE). As the question about household chores has been available only since 2015, I conducted a cross-sectional analysis for 2019, considering individuals living in urban areas 15 years or older.

Given the scope of the research and the methodological challenges of identifying families in the PNADc or other Brazilian household surveys, the study will use the household unit as the category of analysis instead of the family itself. According to Wajnman (2012), this category is "... *composed of the intersection of kinship with co-residence, resulting in a group of members who live together and are also linked by some form of kinship*". These individuals share public goods and likely perform other exchanges facilitated by physical proximity and constitute the decision-making unit for various aspects of life.

The following characteristics about the household components are used in the analyses: i. age, used as a continuous variable or categorized into five-year age groups (15 to 19, 20 to 24, etc.); ii. race, constructed, in a binary classification, as a dummy variable with a value of one for self-declared white individuals and 0 otherwise; iii. education, a categorical variable that can be *Basic Education or None* (individuals with no education or less than three years of study), *Complete Elementary Education 1* (4 to 7 years of study), *Complete Elementary Education 2* (8 to 10 years of study), *Complete High School* (11 to 14 years of study), or *Complete Higher Education* (15 or more years

of study); and iv. position in the household, also a categorical variable consisting of *Responsible*, if the person is the household reference or their spouse, *Son* if the person is a son, daughter or stepchild of the reference person, and *Others*, which includes all other cases.

Also at the individual level, variables related to occupation are used: status in the labor market, where individuals can be *Employed, Unemployed or Inactive*; and an occupational stratification typology that takes into account a socio-occupational classification (upper managerial, middle, manual, and domestic worker) as well as the type of insertion (public, private, self-employed, unpaid). This socio-occupational classification is based on IBGE (1994), which uses criteria of the formal education level required for the occupation with the type of specialization of functions to create three occupational levels: upper managerial, middle, and manual. The paid domestic worker occupation, inserted by this study in the manual stratum, is presented in a specific category due to occupational segmentation.

Two variables are used for analyzing individuals' dynamics of time use: individual weekly work hours in all jobs and weekly hours of household chores. This last one includes tasks such as cleaning the house, preparing and serving food, laundry, pet care, and caring for children, elderly, sick, or people with special needs (including care or help with chores for relatives who do not live in the same household)<sup>2</sup>. It is important to point out that, according to Jesus et al. (2021), the lack of detail in the questionnaire of the main survey of PNADc leads to underreporting the hours dedicated to childcare. In that sense, the quantitative results of hours of unpaid domestic work are fundamentally underestimated.

To answer the research question, it is important to take as units of analysis not only the individual but also the household. Households are identified and then classified by tracing kinship relationships between individuals and others present. In this classification, households can be i. one-person; ii. formed by a couple without children; iii. couple with children; iv. single parent; v. extended families, in which in addition to the nucleus there are other relatives, such as grandchildren, parents, in-laws, and other relatives whose bond cannot be established; and finally vi. composite households, where there are non-relatives, and there may or may not be other relatives as well<sup>3</sup>. In addition to the type of household, other variables at the household level are

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<sup>2</sup> The terms “domestic work”, “unpaid work” and “chores” are here used indistinctly and include the care work.

<sup>3</sup> Types of union (civil marriage or cohabitation) are considered indistinctly.

important, such as the dependence ratio of children aged 0-4 years, 5-9 years, and 10-14 years, i.e., how many adults there are for each child in a specific age group.

### 3.2 Empirical Strategy

Descriptive analyses and regression models are employed to identify and isolate the effects of individual, family, or occupational characteristics on time use. In the statistical regression modeling, the dependent variables are weekly hours of paid work and household chores or caregiving. Two types of models are applied: the first is a bivariate model allowing for the simultaneous consideration of time spent on both types of activities, and the second is a univariate model including only the time spent on household chores but also considering the individual's occupational variables.

When modeling the decision to allocate time to paid work and household chores, the main issue is the large presence of zeros in the dependent variables, where people report not having performed these activities in the period in question. The existence of an accumulation of exact zeros is a problem for standard regression models, as the restricted range of the dependent variable makes the censored sample unrepresentative of the population, resulting in inconsistent parameter estimates.

Three different estimation methods are introduced in the literature to solve the problem of many individuals reporting zero hours of work: double hurdle, Heckman, and Tobit. Unlike the Tobit model, Heckman and double hurdle models consider the decision to participate in work as an independent process from the decision about the duration of work. Thus, a specific equation for the participation decision is required, separate from the equation projected for the quantity of work. However, modeling the decision process of participation in household chores is not as simple as in the case of the model for paid work. Additionally, as Flood and Grasjo (1998) pointed out, introducing a poorly specified participation equation in the double hurdle or Heckman model may produce worse results than a Tobit model. Therefore, the Tobit model (Tobin, 1958) is chosen for this work, meaning zero observations will be treated as individuals' desired amount of unpaid and paid work.

The consistency of the Tobit model is based on the assumption that an individual's decision to participate in an activity is determined by the same mechanism that determines the amount of time

spent on that activity, conditioned on participation. The time spent on unpaid work by an individual is modeled at the same time as their hours of paid work. To this end, the bivariate version of the Tobit model is applied, allowing decisions to be modeled jointly, considering both censorship and simultaneity.

The structural equation of the model is

$$y_i^* = \mathbf{X}_i' \boldsymbol{\beta} + \varepsilon_i, \text{ with } \varepsilon_i \sim N[0, \sigma^2] \quad (1)$$

where  $y^*$  is a latent variable linear in the regressors with normally distributed and homoscedastic errors,  $x_i$  is the vector of explanatory variables, and  $\boldsymbol{\beta}$  is the vector of parameters to be estimated.

The model expresses the observed variable  $y$  in terms of the latent variable  $y^*$  as follows:

$$y_i = \begin{cases} y^* & \text{if } y^* > 0 \\ 0 & \text{if } y^* \leq 0 \end{cases} \quad (2)$$

Household members decide how much of their time to dedicate to domestic production while also making decisions about participation in the labor market. Thus, in addition to censoring, simultaneity is also considered using a system of equations with multiple censored variables (Maddala, 1983). The variables are functions of a set of exogenous variables and are determined simultaneously and can be represented by:

$$y_a^* = f(X_a) + \varepsilon_a \quad (3)$$

$$y_{tr}^* = f(X_{tr}) + \varepsilon_{tr} \quad (4)$$

where;  $[\varepsilon_a, \varepsilon_{tr}] \sim N(0, \Sigma)$ ,  $y_a^*$ ,  $y_{tr}^*$  are the latent variables associated with time spent on household chores and paid work, respectively, and  $X_a, X_{tr}$  are the variables that influence the response variables simultaneously.

#### 4 RESULTS AND DISCUSSION

This session describes the main findings of this work regarding the time use of Brazilian women and men in 2019. First, some descriptive analyses are made to provide context, especially in terms of what the most frequent household types are nowadays and the profile of the individuals living in them. The next part focuses on work participation and hours spent, both in paid and



housework/care. Then, other individual characteristics are included, culminating in a multivariate analysis. A Tobit is the model of choice since it allows a simultaneous analysis of these characteristics on both paid hours of work and hours spent on domestic chores and care. Finally, some occupational attributes of men and women are included in the analyses, a valuable step in understanding time allocation among work and private life.

#### 4.1 Household composition

The starting point for investigating the relationship between work and household structure is to understand the types of households in which Brazilians live. When analyzing household data, two perspectives can be used: individuals or families. Table 1 presents the distribution of households based on these two approaches. Most Brazilians live in households formed by a couple with their children. In contrast, around a quarter of the population live in extended households where two family nuclei related to each other coexist, such as a grandfather, his son, and his grandchildren. The next most common household types are couples without children and single-parent households. From a household unit perspective, the most frequent type is the household formed by a couple with their children. In second place are households formed by childless couples, with a frequency very close to extended households. Household units consisting of only one individual have much greater prominence in this perspective, accounting for approximately 16% of the sample.

Table 1- Household types and individual distribution, Brazil, 2019 (%)

	Family`s perspective	Individual`s perspective
One-person	16.51	5.7
Couple without children	17.88	12.34
Single parent	12.88	11.39
Couple with children	34.25	44.11
Extended	17.28	24.91
Composite	1.19	1.56
Total	100	100

Source: Authors' calculation based on PNADc 2019.

Most single-parent households accommodate only one child, along with one of the parents, 60%. Similarly, in households with a couple with children, the highest frequency is three residents (48%), representing only one child. This information may indicate couples' and individuals' preferences for the number of children. Still, it is important to note that the data only refer to children residing

in households, not those born to the couple. The extension in life expectancy increases the time individuals share residence with relatives for all types of family arrangements (Cunha et al., 2018). The most frequent occurrence in extended households is 3 or 4 residents, approximately 25% in each category. The most common occurrence in composite households is households with two residents, representing around 30%.

The type of household that an individual belongs to is closely linked to their life cycle. Initially, we are children living in our parents' homes; then, we may live alone or with friends in composite households until we unite with a partner and form a new household. Children may then arrive, grow up, and eventually form their own families in separate households. However, this pattern is not necessarily followed by everyone, and individual trajectories are becoming increasingly diverse. Nevertheless, it is important to investigate the most common patterns and how the individual life cycle is connected to household type.

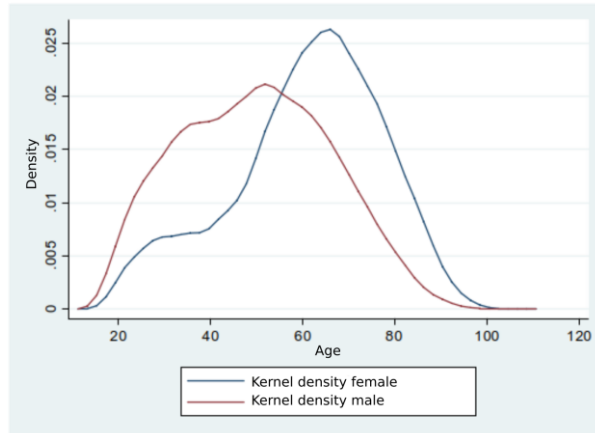
This link between the life stage and types of co-residence is also gendered. For example, women tend to spend less time living with their parents but more time living with their children compared to men. Additionally, women marry at a younger age than men but spend less time living with their spouses, often due to outliving their male partner or remaining divorced for extended periods (Cunha et al., 2018).

The age distribution illustrates some household types' life cycle patterns (Figure 1). There are significant differences in the male and female behaviors in single-person households. The frequency peak is higher and occurs later for women, at around 65 years, while the male peak is flatter and occurs in a younger age group, around 55 years. In childless couples' households, however, male and female behaviors are more similar, with only a small difference in the peaks occurring in younger age groups for women. In these households, it is interesting to note the presence of two peaks: a secondary one in the age group where the couple forms when they still do not have children (around 30 years old), leading to a valley (around 40 years old) where households formed by these couples probably now accommodate children. The movement is reversed with the children leaving home, leading to a new age peak at 60. What happens after this peak is related to the greater presence of extended households when the couple reaches this age group and the intensification of the mortality rate. In households of couples with their children, there is only one

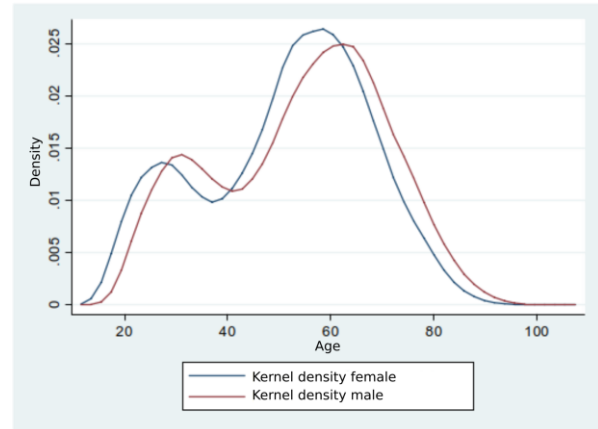
peak at approximately 38 years old, and the female and male behaviors are not distinguishable in that sense.

Figure 1 – Age distribution on selected household types by gender, Brazil, 2019

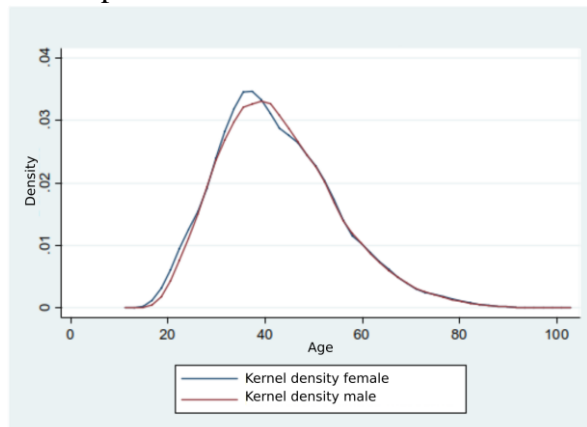
i. One-person household



ii. Couple without children household



iii. Couple with children's household



Source: Authors' calculation based on PNADc 2019.

Single-parent households are those in which only one parent or guardian shares the residence with one or more children. Traditionally, it is assumed that the person responsible for this household is the father or, more commonly, the mother and that the children have a secondary role in the management of the household, whether it be financial, household chores, or responsibility. This is the case for 90% of the sample. However, this is also the case for an adult living with one of their parents, including the possibility of siblings being present. Single-parent households in the former case are mostly headed by women (Sorj et al., 2007); this is the case for 83% of the sample. In the

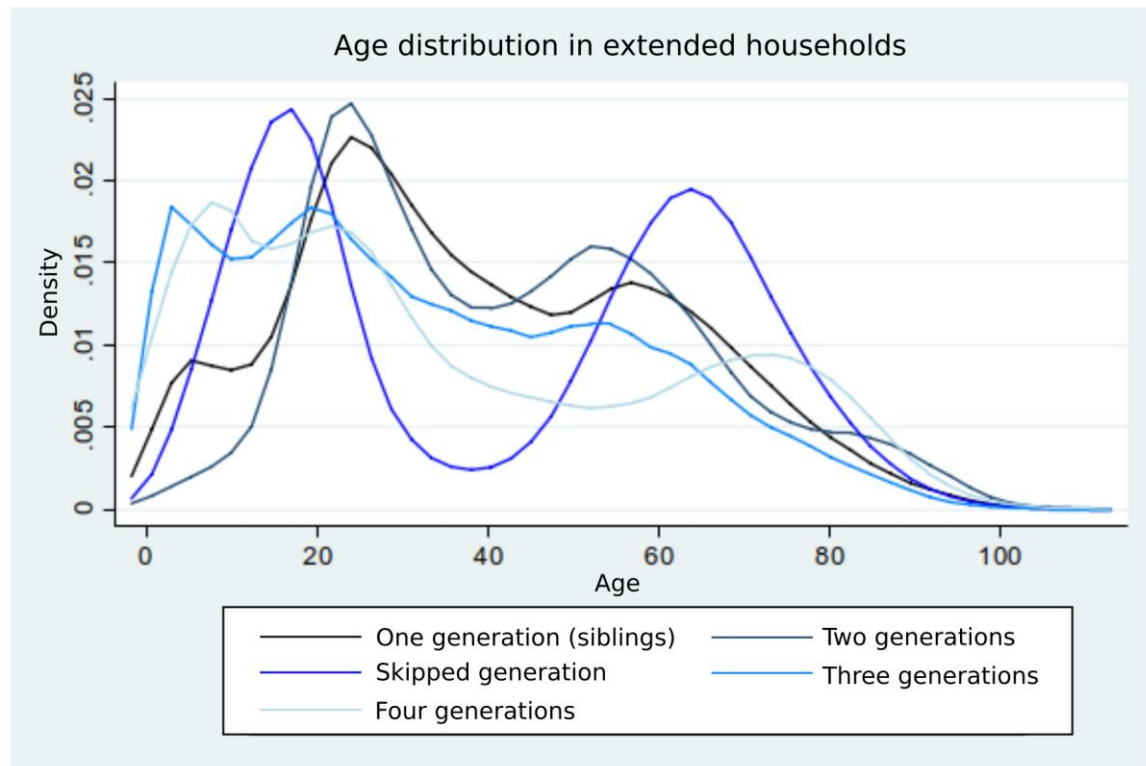
latter case, there is a radical change in composition: 50% of single-parent households where the responsible person lives with their parents are headed by men, and women head 50%.

There is a diversity of formats in households that go beyond a nuclear family; this is the case for extended and composite households. In extended households, more than one nuclear family is present, while composite households feature an external element to the family. Those could be non-relatives who do not share expenses, known as aggregates (the case of 50.9% of composite households), cohabitants (non-relatives who share expenses, 39.9%), pensioners (0.74%), domestic servants and their relatives (6.38%).

In extended households, depending on the residents' categories, the following may be present: i. three generations, i.e., at least one grandparent, one parent and one child; ii. the first and third generation or three "skipped" generations if one of the grandparents is present with at least one grandchild; iii. four generations when a great-grandchild is present (due to database limitations, this category includes cases when all four generations are present and when only some of the four are present); iv. two generations, such as the case of parents and their child's partner who also live in the household; and v. households formed by siblings, which may or may not include their partners and children. Individuals in three-generation households represent 59% of the individuals living in extended households, and approximately 10% live in skipped-generation households, the same number as those in sibling households.

The age distribution of individuals in each of these types of extended households is shown in Figure 2. Notably, skipped generation households exhibit two clear peaks, one around 18 years old and another around 60, the ages that have more "supply" of grandparents and grandchildren; four-generation households also display several peaks, the first around ten years old and the last around 75 years old, which are ages when four generations can coexist at the same time. One- or two-generation households exhibit the first peak at an older age, indicating the lower presence of children in these households. Interestingly, the more "generations" present in the household, the smoother the age distribution, with flatter peaks, as age dispersion, by definition, tends to be greater.

Figure 2 – Age distribution in extended households, by type of coexisting generations, Brazil, 2019



Source: Authors' calculation based on PNADc 2019.

#### 4.2 Labor Features

The paid and unpaid work participation of individuals from each type of household are shown in Table 2. Among women, the ones in households with couples with children, single-parent and composite have the highest employment rates, with approximately 50% of women employed or actively seeking employment. In contrast, female participation in the labor market is lower in single-person and extended households, possibly due to their age composition, with a higher presence of young people. Comparing households with couples with and without children, women in households with children have greater participation in the labor market, indicating an income effect caused by the presence of children and life cycle factors that may differ across family types.

For men, there is also great variability between households, with single-parent households showing the lowest frequency of labor market participation, largely because men are more frequently sons in these households than responsible individuals, along with extended households, which indicates an age effect. Households of couples with children have the highest male employment rates. These

results are consistent with Guiginski and Wajnman's (2019) findings for the country, which suggest that the presence of a spouse is related differently to the chances of men and women offering their labor force, as it reduces female participation and increases male participation. An inverse pattern is found in the relationship between the number of children in the household and the probability of inactivity, with the probability of men decreasing and that of women increasing as the number of children increases (Oliveira et al., 2009).

Table 2 – Labor market status and domestic unpaid work, by household type and gender, Brazil, 2019, (%)

	Men					Women				
	Emp.	Unemp.	Not in labor force		Chores	Emp.	Unemp.	Not in labor force		Chores
One-person	62.71	4.82	32.47	100	91.86	38.17	3.08	58.75	100	93.28
Couple without child.	60.91	3.41	35.68	100	85.54	45.54	4.52	49.94	100	96.31
Single parent	54.8	12.25	32.95	100	78.12	49.56	8.71	41.73	100	91.89
Couple with children	71.76	7.19	21.05	100	81.52	51.8	8.34	39.85	100	94.56
Extended	56.43	9.8	33.78	100	72.29	39.72	8.28	51.99	100	88.6
Composite	64.37	8	27.64	100	77.11	50.51	9.2	40.29	100	87.65
General	64.08	7.55	28.37	100	80.34	46.25	7.47	46.27	100	92.64

Source: Authors' calculation based on PNADc 2019.

Men in single-parent households have the lowest employment and the highest unemployment rates, as women mostly head these households, and men are likely to be younger and take on the role of son in the household. Similarly, many single-person households are made up of young people, and therefore, their low employment rates originate more from inactivity than unemployment. On the other hand, extended households are those that, in addition to young people, are also more likely to have older people, as it is necessary to have relatives such as grandchildren and grandparents to form a multigenerational household. According to the typology, this age pattern underlies the labor force status of household members.

The female unemployment rate is higher than the male (considering it in relation to the total of the economically active women in the sample, and not the total one) in all cases except for single-parent households. This higher unemployment rate may be related to age since, again, men frequently have the role of son in these households.

Finally, regarding individuals who reported performing some household chores, single-person households have the smallest difference between men and women who spend some time per week on unpaid domestic work, with over 90% of both men and women reporting doing so. According to what was found for the country by Garcia et al. (2022), the presence of a male partner in the household increases the chances of women performing housework and care activities (comparing one-person households with couples without children). On the other hand, for men, the contrary is found, and living with a partner reduces their probability of performing any kind of housework.

More individuals report not doing chores in households formed by couples with children than in those without children, due to the presence of children, who are also included in the statistics when they turn 15. In that sense, couples without children's households have the highest rate of performing some unpaid work among women and the second highest rate among men, after single-person households. However, the presence of other relatives increases the probability of Brazilian women performing care activities (Garcia et al., 2022); extended households, alongside composite, present smaller rates of participation in chores. That is also due to the inclusion of these relatives and other residents in the statistics, highlighting the need to include the role of each individual in the analysis.

#### 4.3 Workload of paid and unpaid work

On average, men spend more time in paid work than women, while women spend more time on domestic work than men. That result is maintained across all household types (Table 3). The highest average time spent on paid work for men is found in households of couples with or without children (41 hours per week), while the greater average for women is in composite ones<sup>4</sup>. Women have the smallest average paid workload in households with children or multiple nuclei (extended). On the other hand, in households of couples with children, women spend the most time on domestic chores, with this average being more than double the male's. The gender gap is of this magnitude in all other households, except in single-person households where men spend an average of approximately 14 hours per week on domestic chores, while women spend 19.

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<sup>4</sup> These statistics only considered individuals who worked, that is, with values different from 0 for the hourly workload. This is important to emphasize since the proportion of individuals not involved in these activities varies between genders and between types of domiciles.

Since women spend on household chores and care in single-parent households approximately 20 hours and in couples without children 21.2 hours, the increased workload that having a partner in the household represents is larger than the presence of children. This result may be derived from factors linked to the individual and family life cycles in these households, such as generational values about gender roles, personal values, and levels of expectation for care and house chores. Attitudes towards gender change throughout the life cycle and are influenced by important life events, mainly the transition to parenthood. The existence of children intensifies the traditionalism of the division of tasks in the household, increasing the proportion of women's domestic work and decreasing men's (Bianchi et al., 2000; Zhou, 2017).

Table 3 – Time use allocation among domestic and paid work, by gender and household type, Brazil, 2019

		Women		Man		Difference
		Average	SD	Average	SD	
Chore hours	One-person	18.96	-11.71	14.15	-9.11	4.81
	Couples without children	21.22	-12.53	11.32	-8.79	9.90
	Single parent	19.98	-13.33	11.29	-9.03	8.69
	Couple with children	22.50	-15.15	10.44	-8.78	12.06
	Extended	20.67	-14.34	10.13	-8.54	10.54
	Composite	18.09	-13.56	9.90	-7.61	8.19
Worked hours	One-person	36.40	-14.03	40.50	-12.84	-4.11
	Couples without children	36.41	-13.28	41.27	-12.09	-4.85
	Single parent	36.34	-13.08	39.05	-12.10	-2.71
	Couple with children	35.85	-13.01	41.29	-11.74	-5.44
	Extended	35.61	-13.01	39.73	-11.87	-4.12
	Composite	38.01	-13.18	40.05	-11.73	-2.05

Source: Authors' calculation based on PNADc 2019.

Two distinct types can be distinguished in single parents households: one where one parent, usually the mother, is responsible (Type 1), and the other when a son or daughter is responsible (Type 2). In both cases, the workload for the self-proclaimed responsible does not change substantially (Table 4). Sons and daughters in these households headed by women do fewer chores than those who live with their fathers. The trend applies to parents who live in households headed by their sons, as they perform more hours of chores than parents who live with their daughters. Therefore, even in single-parent households, the gender of the "responsible" is a stronger indicator of the division of labor dynamics than the household configuration.



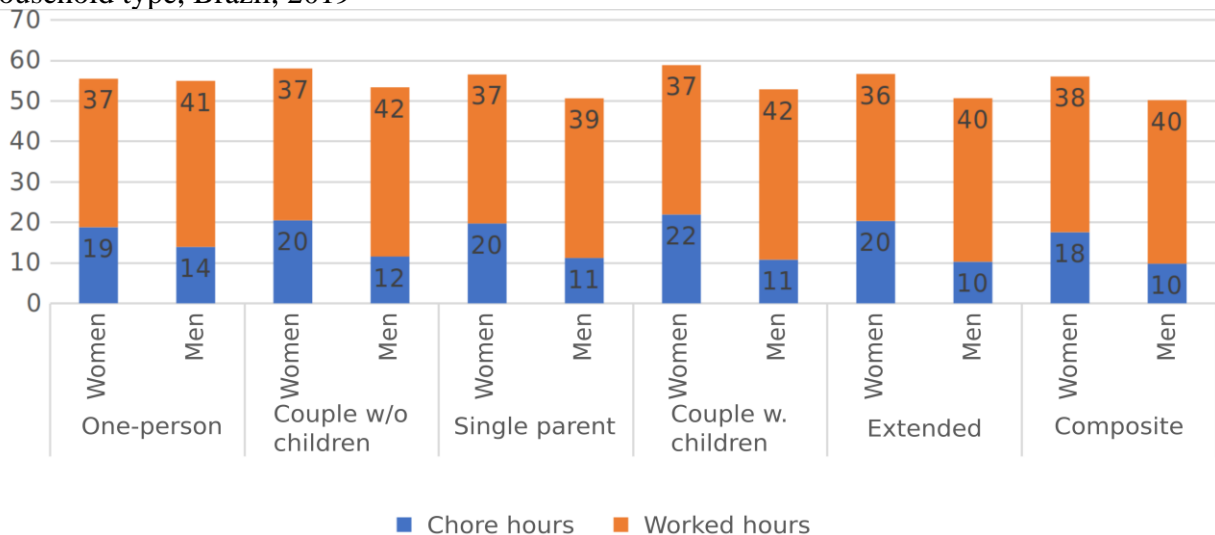
Table 4 – Average weekly hours of domestic and paid work in single-parent households, by gender of the head, type of household and household position, Brazil, 2019

		Male head		Female head	
		Chores	Paid work	Chores	Paid work
Type 1	Head	14.61	41.77	22.28	37
	Son/daughter	13.1	37.7	11.8	37.61
Type 2	Head	13.65	39.81	21.66	37.77
	Father/mother	18.07	38.99	15.39	38.98
	Siblings	11.79	39.27	14.02	38.07

Source: Authors' calculation based on PNADc 2019.

The combined weekly average workload of household chores and productive activities for men and women is between 50 and 60 hours. In all household types, women have a higher average workload than men (Figure 3). The highest workload among women is for those who live with husbands and children, followed by couples without children, and women in single-parent households. Therefore, it appears that the presence of a partner in the household apparently has a greater effect on increasing the overall workload than that of children. However, these values are averages and do not address questions about the frequency and determinants of the effective performance of both types of activity. For instance, roughly half of Brazilians do not accumulate two workloads, with most men not performing regular domestic work and a large proportion of women not employed in the labor market (Medeiros & Pinheiro, 2018).

Figure 3 – Time allocation in paid market work and unpaid domestic work, by gender and household type, Brazil, 2019



Source: Authors' calculation based on PNADc 2019.

Education is important when analyzing time use (Bianchi et al., 2000; Killewald, 2011). It directly relates to labor income, which also represents the opportunity cost a worker faces of not offering their labor force at the market. When deciding how to allocate a scarce resource, in this case the finite hours of the day or week, a decisive factor is the relationship between the price of one's own work (i.e., wages) and the market value of the services that will be demanded to make a labor force offer possible, like household chores or care work. This is the price effect; there is also the income effect acting in this decision since more education is directly related to higher income, and thus, financial resources are available for outsourcing tasks. However, these are not the only ways in which education can be related to time use and reproductive work: the values or attitudes related to the realization and division of unpaid domestic work are sensitive to the education level of family members or at least represent a proxy for the mechanisms that are relevant in attitude formation (Zhou, 2017).

There is an inversely proportional relationship between a woman's education and her time spent on household chores and a direct relationship with the time spent on paid work. The positive impact that education has on hours worked has the most pronounced effect on women, as found in previous studies for Brazil (Queiroz and Aragón, 2015; Barbosa, 2018). The relationship between education and time spent on household chores or paid work is unclear for men. In addition to the opposing influences of the income or price effect and attitudes, the fact that men often play the role of main providers in the household makes their work time less sensitive to these factors.

Table 5 – Average work hours of domestic and paid work, by gender and education level, Brazil, 2019

	Chores			Paid work		
	Women	Men	Differ.	Women	Men	Differ.
Basic education or none	22.38	11.49	10.89	32.24	39.1	-6.86
Elementary school 1 complete	22.44	11.11	11.33	34.36	41.25	-6.89
Elementary school 2 complete	20.47	10.58	9.89	35.54	41.24	-5.7
High school complete	20.65	11.19	9.46	37.81	41.96	-4.15
College complete or more	17.58	10.92	6.66	37.84	41.18	-3.34

Source: Authors' calculation based on PNADc 2019.

#### 4.4 Multivariate analysis

The bivariate Tobit model enables a simultaneous analysis of the impact of individual and household characteristics on both hours worked and hours spent on domestic chores, including care

work. The null hypothesis of independence of time use in different activities is rejected since the correlation between errors is significant at 1%, both for men and women (Table 6).

Table 6 – Bivariate Tobit model of domestic and paid work hours, for men and women, Brazil, 2019

	Men		Women	
	Chores	Paid work	Chores	Paid work
Son/daughter	-4.32 ***	-14.42 ***	-7.53 ***	-6.01 ***
Other	-3.63 ***	-11.30 ***	-8.17 ***	-5.31 ***
15 to 19	-1.61 ***	-32.69 ***	-5.13 ***	-35.40 ***
20 to 24	-1.22 ***	-6.98 ***	-2.25 ***	-11.57 ***
25 to 29	-0.79 ***	-1.20 ***	-1.40 ***	-3.99 ***
30 to 34	-0.08	0.10	-0.70 ***	-0.99 ***
40 to 44	0.05	0.08	0.17	-0.08
45 to 49	-0.06	-0.42	0.74 ***	-1.67 ***
50 to 54	0.05	-4.03 ***	1.84 ***	-6.05 ***
55 to 59	0.36 ***	-9.13 ***	2.60 ***	-15.22 ***
60 to 64	0.78 ***	-19.55 ***	2.58 ***	-28.75 ***
65 or more	-0.40 ***	-44.18 ***	-2.66 ***	-53.09 ***
Race (white)	0.00	1.63 ***	-0.64 ***	2.07 ***
Elementary school incomplete	2.30 ***	8.35 ***	2.65 ***	9.63 ***
Elementary school complete	3.26 ***	11.02 ***	2.50 ***	14.02 ***
High school complete	3.69 ***	14.44 ***	1.49 ***	23.22 ***
College complete or more	3.00 ***	16.21 ***	-2.45 ***	31.05 ***
Couples without children	-3.39 ***	2.64 ***	1.94 ***	-4.90 ***
Single parent	-1.73 ***	2.10 ***	1.89 ***	-1.70 ***
Couple with children	-4.86 ***	2.99 ***	2.94 ***	-7.75 ***
Extended - 1 ou 2 ger.	-4.27 ***	2.34 ***	1.88 ***	-3.99 ***
Extended - 3 ou 4 ger.	-6.13 ***	1.87 ***	1.44 ***	-4.59 ***
Extended - <i>skipped</i>	-4.56 ***	-0.13	2.91 ***	-4.60 ***
Composite	-4.54 ***	3.55 ***	0.03	-1.42
Dep. ratio children 0-4	10.86 ***	6.73 ***	21.13 ***	-17.90 ***
Dep. ratio. children 5 - 9	5.76 ***	3.01 ***	10.56 ***	-7.08 ***
Dep. ratio. children 10 - 14	1.53 ***	2.09 ***	3.80 ***	-0.71

Note: References are “Head or spouse”, “35 to 39 years old”, “Basic education or none”, e “One-person”.

Source: Authors’ calculation based on PNADc 2019.

The household position is critical for determining hours worked for both men and women. Household heads, whether they are the designated reference or their spouses, are the ones who spend the most hours on both activities. This result is consistent for both genders. As expected, the

life cycle strongly affects the hours men and women spend on domestic chores and care. This workload increases with age until the last category and the workload of paid work has an inverted U-shape, peaking at the middle of the 40s.

The effect of formal education goes in the same way as presented in the descriptive of Table 5. The increase in the hours of paid work is more intense for women, given their greater variation in working hours, which are more concentrated at zero than those found among men. Conversely, for domestic work, the opposite effect is observed. Except for the reference category, for each completed educational level, the time spent on average on domestic work is lower. In contrast, men spend more hours on domestic chores for each educational level completed up to high school. There is a relationship between education and more gender-equitable attitudes for men, whereas, for women, this relationship is more related to education and opportunity cost. The race variable was significant, except for chores among men, and indicates that white women perform fewer hours of chores while white men and women dedicate more time to paid work.

Household type is also essential for both women and men in determining paid and unpaid working hours, and the results also align with the descriptive statistics. Women have the highest average hours of paid work in single-person and single-parent households. This household composition pushes women into the labor market through distinct dynamics. Households formed by couples with children have the smallest average paid work time among women, who, on the other hand, have the highest non-paid work time.

Women in multigenerational households with a skipped generation perform approximately the same amount of non-paid work hours as those in households with couples with children, a result also observed among men. On the other hand, in extended multigenerational households (3 or 4 generations), women can distribute household chores and care, resulting in the smallest workload compared to women living alone (considering only the statistically significant ones). In essence, the coexistence of multiple generations creates an "economy of scale" in care, reducing at least on average, the time spent on household chores per capita. According to Jesus and Wajnman (2016), the concept of "sandwiching", where adults are simultaneously responsible for children and aging parents, is not prevalent in Brazil, since the same characteristics related to having children under 14 years old are related to not having a mother with some incapacity residing in the household. This indicates a division of tasks between grandparents and parents or two descendant generations

who are under the care of an older individual. On the other hand, being in an extended household of three or more generations or a skipped generation household has approximately the same effect on hours spent on productive work, which is a lower average than women in households of couples with children.

Men's patterns regarding household types do not differ much, and the highest working hours are in composite households and households of couples with children. On the other hand, female single-person households have women with the lowest household chore/care hours, in contrast to male single-person households, which house the men with the highest hours. These results reinforce what Barbosa (2018) found: married men perform fewer hours of domestic chores than single men, and married women dedicate more hours than single women. The relationship moves in the opposite direction in the labor market workload.

Comparing households of single men and women with those consisting only of couples, women have an additional burden of an hour and a half per week of unpaid work due to sharing the house with a partner, and men save three and a half hours per week by not living alone. This confirms findings in other countries where women's housework hours increase and men's decrease after marriage (Gupta, 1999; Kizilirmak & Memis, 2009). Regarding the presence of children in the household, it does not increase men's participation in chores and care when a co-responsible partner is present. The time spent on it is lower than individuals who only care for themselves in a household for four and a half hours per week.

A woman sharing a household only with her husband spends slightly more time on housework than one who lives in a single-parent household. Comparing the average time on non-paid work of women with and without a male partner present in households with sons and/or daughters, the difference is even greater (with a coefficient increase of more than 50%). It is important to emphasize that these results hold other factors like age, schooling, and household position constants. In that sense, explanations regarding individual and family life cycles, generational values, and aspirations can account for only some of the pattern of a husband, on average, being more a demanding force of time than the presence of sons and daughters. Again, it highlights the need for other explanations that are more focused on the gendered roles played by the individuals inside their households.

The dependency ratio is also important for determining the household and paid work hours, especially for women. The more children per adult in the household, the more hours of housework for men and women, and the younger the children, the greater the impact. However, the effect on paid working hours differs for men and women: a higher dependency ratio negatively affects women's working hours but positively affects men. The more children per adult in the household, the younger they are, the more hours men spend in the labor market. This illustrates the income effect of having children in the household, and the need for care is accompanied by the need for financial resources, reinforcing the family specialization between men, who focus on paid work, and women, who focus on care work.

#### 4.5 Occupational categories

It is important to analyze the other side of the work/family relationship in individuals' time allocation: the occupational insertion. Table 7 presents the occupational composition of the sample according to household type and gender. Men, regardless of the household type, in comparison to women, are more present in manual occupations and less in intermediate occupations. This pattern is related to the occupational composition of the classes since many typically male occupations, such as farming or construction work, fall under the manual category. In contrast, numerous typically female occupations, like secretary or teacher, are classified as intermediate.

Table 7 – Occupational categories distribution, by household type and gender, Brazil, 2019 (%)

	Women					Men				
	High	Interm.	Manual	Domest.	Total	High	Interm.	Manual	Domest.	Total
One-person	21.1	17.3	48.0	13.7	100	12.0	9.7	75.5	2.9	100
Couples without child.	19.5	15.9	54.4	10.2	100	12.7	9.8	76.5	1.1	100
Single parent	15.8	19.3	49.8	15.1	100	10.0	15.1	74.3	0.6	100
Couple with children	20.0	18.5	51.8	9.7	100	10.9	11.4	77.0	0.7	100
Extended	13.9	18.8	55.0	12.2	100	7.2	11.3	80.9	0.7	100
Composite	19.4	19.1	46.1	15.5	100	14.6	14.1	70.1	1.2	100

Source: Authors' calculation based on PNADc 2019.

Extended households have the highest proportion of men and women in manual occupations and the lowest in high status occupations (7% of men in these households are in high status occupations and 80% in manual occupations, which are 13% and 55% for women). Paid domestic workers are proportionally more represented in single-parent or extended households, and less present in households of couples and their children.

What is the relationship between occupational insertion and time spent on paid work and unpaid domestic work? If women can outsource "household production" using their financial resources, women's income (either at their own level or relative to their partner) would positively correlate with expenditures on time-saving goods and services, and a negative correlation with the time spent on chores and care. In this scenario, individuals are essentially buying out – using their income to pay for services and goods – thereby reducing the personal time they spend on housework. However, the literature shows that this direct relationship does not explain the relationship between domestic work and women's incomes. This could originate from the perception that goods and services purchased in the market are inadequate substitutes for familial contributions. Additionally, according to the theory of doing gender, the woman, even with high wages and the possibility of obtaining in the market the satisfaction of domestic needs, must apply part of her time in the care of her household as a form of irreplaceable validation (Fontoura & Gonzalez, 2009; Kizilirmak & Memis, 2009).

Even though the analysis has not been based solely on income but on a more general classification of occupations, the distribution of average hours of housework by occupational category suggests the presence of a buy-out phenomenon in Brazil (Table 8). Occupational status is proportional to income; Brazilian women in manual occupations and paid domestic service spend approximately 25% more time per week on domestic activities than women in high and intermediate occupations. Among men, on the other hand, there is a small difference in the time spent on domestic chores and care by occupational categories. Regardless of occupation type, women have a greater unpaid workload than men, and men have a longer paid workload. Nevertheless, when accounting for both productive market work and household work, the total workload is higher for women across all categories.

Paid domestic workers are a category that stands out: these individuals are the ones who have the shortest paid workday and the longest domestic chores, and male domestic workers, mostly gardeners and drivers, have the longest hours in both categories.

Table 8 – Average weekly hours spent on activities, by gender and occupational category, Brazil, 2019

	Chores		Paid work	
	Women	Men	Women	Men
High	15.98	10.18	37.07	41.36
Intermediária	15.96	10.27	38.36	39.72
Manual	19.40	10.26	36.21	40.75
Domestic	20.45	12.69	30.43	42.39

Source: Authors' calculation based on PNADc 2019.

Beyond occupational status, other dimensions of labor market participation are important for the analysis of time use, the type of insertion, that could be public sector, private sector, self-employed, managerial, or unpaid. Tables 9 A and B present the average hours of domestic work for men and women considering two levels of analysis: household composition and occupational insertion, classified by occupational status and insertion type. Among women, the two "axes" play a significant role in determining the weekly time spent on occupational and household tasks. Regardless of household composition, women in more manual occupations allocate more time to chores than the others, and the same happens, regardless of occupational type, to women who live with their partners and children. The private sector employs women with the least time spent on chores, while those in the public sector allocate more time to reproductive activities. In manual occupations, self-employed women tend to spend more time on domestic activities, but the longest hours are recorded for paid housekeepers and unpaid workers.

For men, this dynamic is different: the axis of occupation does not carry as much weight as the household structure axis. Men living alone spend more time on household chores than others, and the average time spent on these activities does not vary significantly when comparing, for example, those with and without children at home, as with women. There is indeed an effect of purchasing power when it comes to outsourcing domestic work, but it is more pronounced in men living alone than in other cases.



Table 9 - Average hours of housework, by gender, household type and occupational category, Brazil, 2019

	One-person	Couples without child.	Single parent	Couple with child.	Extended	Composite
<b>A - Women</b>						
Leadership	13.46	14.13	14.29	17.23	13.2	10.96
High, private	12.15	12.94	13.78	16.64	13.44	11.39
High, public	14.37	14.79	16.81	18.38	15.54	13.5
High, self-employed	13.23	14.99	15.65	18.9	15.02	13.77
Intermediate, private	14.93	14.87	14.6	15.91	13.75	11.41
Intermediate, public	16.09	15.62	16.95	18.04	15.87	14.52
Intermediate, self-employed	16.17	14.55	17.71	20.63	19.63	15.27
Manual, private	16.59	16.74	17.31	18.65	15.91	13.47
Manual, public	18.67	18.37	19.14	20.7	18.26	14.53
Manual, self-employed	19.61	20.12	21.3	23.49	21.44	17.73
Domestic	18.62	19.48	20.39	21.57	19.69	23.83
Not paid	18.62	21.4	19.48	22.61	21.63	18.77
Don't work	20.1	23.52	21.9	25.26	22.72	19.42
<b>B - Men</b>						
	One-person	Couples without child.	Single parent	Couple with children	Extended	Composite
Leadership	9.95	8.68	8.41	10.17	9.34	8.27
High, private	10.77	9.37	9.16	10.54	9.41	8.63
High, public	11.02	8.81	11.88	11.96	9.58	7.05
High, self-employed	11.85	10.37	11.06	11.31	11.07	10.83
Intermediate, private	12.46	10.07	9.6	10.37	8.78	9.16
Intermediate, public	12.26	9.64	10.49	11.14	9.37	9.12
Intermediate, self-employed	12.47	10.85	10.28	10.93	10.02	10.75
Manual, private	12.68	10.07	9.96	10.38	9.33	9.91
Manual, public	13.29	11.56	11.62	11.31	9.96	7.75
Manual, self-employed	14.5	10.99	12.15	10.73	10.04	10.6
Domestic	15.08	10.64	16.04	13.05	12.58	17.56
Not paid	15.5	12.73	11.2	10.64	9.17	13.5
Don't work	15.6	13.7	12.3	11.46	11.43	10.09

Source: Authors' calculation based on PNADc 2019.

In that sense, it is important to include occupational categories in the statistical model and isolate the effects that may influence time use. This time, the model employed is the univariate Tobit model for time spent on chores, which does not account for the interaction between errors in the model of hours of paid work. This choice is justified because occupational characteristics should

not influence the decision to offer paid work. The coefficients found for the occupational categories on time spent on housework and care are shown in Table 10<sup>5</sup>.

Table 10 – Tobit model of chores and care work hours, for men and women, Brazil, 2019

	Men	Women
Leadership	-3.3 ***	-9.62 ***
High, private	-2.89 ***	-9.03 ***
High, public	-2.32 ***	-7.56 ***
High, self-employed	-2.1 ***	-7.99 ***
Intermediate, private	-2.13 ***	-7.56 ***
Intermediate, public	-2.22 ***	-7.31 ***
Intermediate, self-employed	-1.75 ***	-6.17 ***
Manual, private	-1.11 ***	-6.89 ***
Manual, public	-1.11 ***	-6.16 ***
Manual, self-employed	-1.27 ***	-3.27 ***
Domestic	1.48 ***	-4.98 ***
Not paid	0.6	-1.67 ***

Note: The reference is “Don’t work”.

Source: Authors’ calculation based on PNADc 2019.

All individuals who work, whether men or women, devote fewer hours of housework than those who don’t work (the reference category), except for female domestic workers. An inverse relationship between a woman’s time spent in housework and her socio-occupational category is found, reinforcing the results from the descriptive analyses. Among the work arrangements, self-employment is associated with a greater workload of domestic chores, regardless of whether the occupation is manual, intermediate, or high-skilled. It is challenging to determine the causality of this relationship, as women who are more overburdened with household work may turn to this form of work in search of flexibility, or, likewise, the flexibility of being self-employed may allow them to fit more time for chores and caregiving into their routine.

Among women, those in the public sector tend to do more domestic work in their households compared to the private sector. The distinct system of demands and incentives in public service and job security may result in a shorter paid workday, giving workers more time for chores and caregiving activities. This pattern is not so clear among men, and occupational status seems to be the biggest factor influencing the time spent on chores.

<sup>5</sup> There are no strong effects of disregarding this feedback between the two types of time use and of including the occupational category in the other conditionals. In that sense, Table 10 shows only the occupational coefficients. The remainder of the model is presented in the Appendix.

In this context, the allocation of time varies significantly between genders and is also influenced by individual characteristics, household structure, and, when relevant, occupational status. These factors have different impacts on men and women in the decision regarding engagement in household chores, caregiving responsibilities, participation in the labor market, and the amount of time devoted to each of these activities.

## **5 CONCLUDING REMARKS**

This paper shows how individual, household, and occupational characteristics affect the allocation of time between paid and unpaid work for Brazilian women and men. Overall, the results reveal a very traditionalist pattern of time use, also influenced by the household composition. Also, beyond presenting distinct patterns of time spent on paid and non-paid work, the factors influencing this allocation do not act the same on men and women. Besides the great diversity in household arrangements, gender inequality is a common feature in the division of unpaid domestic work among Brazilian women and men.

For instance, women with higher education do less housework, while men with higher education do more. While women may use their income to purchase time-saving products and services that reduce the time spent on domestic work, men's attitudes appear to play a more significant role in increasing their domestic work hours as they become more educated. Other individual characteristics that influence time allocation are household position and age, with more generalized relationships among both genders.

Household composition indeed plays an important part in determining an individual's time spent on paid and non-paid work. Single-person and single-parent households house the women who spend more time on average on labor market work and less on housework. Men living alone, in contrast, are the ones who spend more time on domestic chores. Additionally, comparing these households of single men and women with those consisting of couples, women have an additional burden of an hour and a half per week of unpaid work due to sharing the house with a partner, and men save three and a half hours per week by not living alone.

Regarding the presence of children in the household, it does not increase men's participation in chores and care when a co-responsible partner is present, but it does increase their paid workload.

However, the number of children per adult will likely increase men's domestic workload, especially younger children. The increased time spent on chores and care for women with children is outweighed by the drop in the number of hours worked in the labor market, which appears to provide them a certain advantage. It should be kept in mind, however, that the paid labor market has many more barriers to access than those encountered in the provision of domestic chores, and that this type of work is considerably under-reported in these types of surveys.

Interestingly, a male partner in the household generally increases a woman's housework more than a son/daughter, even when factors like age, position the person holds in the household and education have already been considered. This result suggests that the gendered roles played by the individuals inside their households have indeed a structural root and explanations regarding individual and family life cycle and generational values can account for only some of this pattern. A large part is still attributed to the gender roles of each separate sphere.

Finally, occupational characteristics also correlate with an individual's time spent on housework. There is a tendency to perform fewer domestic activities the "higher" the woman's socio-occupational category, indicating the availability of financial resources that can be used to "buy" replacements for domestic work, such as time-saving domestic appliances, integral and private childcare, and schools, and paid domestic workers. Among men, on the other hand, there is little difference in the time spent on domestic chores and care by socio-occupational status.

Regarding the type of insertion in the labor market, self-employment is related to more time spent on domestic chores and care, whether in manual, intermediate, or higher occupations, a relationship that is also present among men. It is interesting to question the causality of this relationship: whether the overload of tasks leads women to resort to the flexibility of this form of work, or whether the flexibility of being self-employed can allow them to fit more time for chores into their routine.

It is important to emphasize the analytical gains obtained from the novelty of considering an interaction between occupation and household characteristics. The two analysis points among women are very important in determining the weekly time spent on chores and care. Regardless of household composition, women in more manual occupations allocate more time to chores than others, and the same happens to women who live with their partners and children, whatever the occupational type. A distinct dynamic emerges for men since occupational characteristics do not

carry as much weight as the household structure, especially the presence of a woman to delegate the housework.

Another highlight is the universality of the unequal division of unpaid domestic work, despite the great arrangement diversity. Taking the role of the main responsible for the activities of care and reproduction of life, in addition to the still newly conquered space in the labor market, represents a double burden that most women face. This combination of unpaid domestic work and paid work can generate profound effects on women's work patterns throughout the family life cycle, reinforcing the gender wage gap and aggravating power distortion.

Furthermore, the Brazilian case seems to be another case of the incomplete gender revolution, a phenomenon described by various countries. As a development step of this work, the temporal expansion of this work can be suggested. Going back some years to identify potential trends and going forward some years to address some possible structural changes brought by the COVID-19 pandemic can contribute to expanding the levels of understanding of this complex phenomenon.

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## **STUDY 2 - DYNAMICS OF INCOME ASSOCIATIONS IN BRAZILIAN COUPLES: A GENDER APPROACH**

### **ABSTRACT**

The educational gender gap that traditionally favored men has been reversed worldwide. Even though the wage gap did not simultaneously follow this change, there is a discernible shift towards income equality within couples. The paper investigates the evolving dynamics of labor income associations within Brazilian couples from 1995 to 2019, identifying possible trends and changes along the income distribution. Descriptive analyses of the relative wage gap, rank association curves, and quantile regressions are used to find patterns in the context of shifting gender roles, non-linear income associations, and the influence of socio-demographic factors. Overall, a general trend towards greater income equality is observed. However, this equality trend seems to be capped when women start earning more than their husbands, with a persistent asymmetry in income associations between genders. Non-linearities are also present in the income dynamics. Poorer couples exhibit more diverse income distributions, indicating increased economic diversity within these partnerships. Quintile regression analysis reveals positive income associations between partners throughout all the income distribution, but stronger in the middle-income segment. During the analyzed period, the wage gap shrunk, yet it did not challenge traditional gender roles regarding the primary breadwinner in the household. Notably, there is more flexibilization of this norm among the poorest individuals, suggesting that this bigger share of wives that are the primary earners rises from economic necessity rather than evolving gender attitudes.

Keywords: earnings inequality, gender wage gap, marriage, rank associations, Brazil

### **1 INTRODUCTION**

Recent literature identifies a trend toward equal earnings among spouses worldwide (Esping-Andersen, 2007; Schwartz, 2010; Gonalons-Pons & Schwartz, 2017). The increase in “positive sorting in earnings” is closely linked to the rise in female participation in the labor force, as well as other social and demographic changes such as postponing unions, falling fertility, and increasing educational attainment levels (Greenwood et al., 2014; Pestel, 2017; Shen, 2021).

In Brazil, the process of accentuating female participation in the labor market began in the 1970s, when social, cultural, and economic factors, especially urbanization and economic growth, triggered significant shifts in women's involvement in the labor market (Bruschini, 2007; Wajnman



et al., 1998). Education, new aspirations, transformations in the family structure, and the development of new gender roles boosted and sustained these transformations. The increase in female participation in the labor market has changed the economic dimension within and between families, as well as behavior in the marriage market (Yonzan, 2020).

The educational gender gap that traditionally favored men has been reversed in several countries (Esteve et al., 2016). Even though the wage gap did not simultaneously follow this change, there is a discernible shift towards income equality within couples. According to Schwartz (2010), husbands and wives have become more equal over the past several decades in several ways; they share the same educational background, have similar wages and hours worked, and have a more equal division of housework and childcare.

These events are integral components of the Gender Revolution, a broader and connected set of systematic changes that have been taking place since the 1960s. Despite being notable, these changes in the gender system have been uneven, occurring more significantly in some groups and life domains than in others and affecting women's roles more than men's (England, 2010). Some even propose a two-phased Gender Revolution, with the first part relating to women entering the public sphere by taking on new roles in the labor market and the second half encompassing increased male involvement in the domestic sphere (Esping-Andersen & Billari, 2015; Goldscheider et al., 2015).

These multiple phases represent an incentive for the relative incomes among partners to adapt to the roles of women and men (England, 2010). In a potential future gender-egalitarian society, partners would be exchangeable into both breadwinning and caregiving responsibilities, and the likelihood of a man outearning his wife would be the same as the wife earning more. This would depend more on their individual productive characteristics than their gender roles. In this context, the pattern of relative income between partners and its changes over time serve as valuable indicators of a society's progress in the Gender Revolution.

Research on the association of spouse income typically focuses on correlation measures across the entire income distribution to assess this trend's impact on inequality across families (Hyslop, 2001; Schwartz, 2010; Gonalons-Pons & Schwartz, 2017; Pestel, 2017). However, the question of whether economic homogamy has uniformly behaved across different income levels remains largely unexplored, although several recent studies have observed an increase in high-earning dual-

career couples in many countries, pointing out that economic homogamy has increased more among high-income individuals (Shen, 2021). Some mechanisms, such as the sharing of resources like social capital, presumably operate less among couples at the lower end of the income distribution, reinforcing the low earning potential of both partners.

The couple formation process has two effects on inequality: the positive assortative mating, which tends to increase inequality, and the income sharing effect, which acts to reduce it. On average, the resource-sharing effect outweighs the assortative mating effect, and pairing has a general inequality-reducing effect. However, these effects are not constant across the income distribution. The income-concentrating effect of assortative mating is most prominent in the distribution's tails. In contrast, the formation of couples in the middle of the distribution tends to occur more randomly. The intensification of pairing between the richest and poorest is associated with inequality within countries. Assortative mating among high-income couples is typical of countries with high inequality, such as Latin American countries, the USA, Spain, and Italy, whereas, among low-income couples, it is typical of less unequal countries like those in Northern Europe (Aaberge et al., 2019).

Much of the literature on this subject is based on developed countries, mainly the United States and Europe, but Brazil provides a good background for studies on partners' earnings patterns. The country not only presents high levels of inequality, but these have changed in recent years, first decreasing but then reverting the pattern (Scalon et al., 2021). At the same time that the country experienced this uneven pattern of changes in inequality, transformations in the family structures and partnering patterns continued to unfold; for example, "*Brazilians are increasingly marrying partners who have similar socioeconomic characteristics*" (Pereira & Santos, 2017). These changes are mainly related to a reinforcement of the trends of general income inequality (Firpo & Portella, 2019). The growing prevalence of dual-earner families, instead of the traditional male breadwinner, especially among younger cohorts, for example, constitutes a limiting factor of income inequality decline (Machado & Ribeiro, 2021). The crucial role of the increased labor force participation of married women in the inequality pattern is connected to a more significant decline in inequality among women and an increasing proportion of household income that the women's income represents (Hoffmann, 2019). Even during the period of inequality reduction, the

concentration of income among the richest did not decline (Medeiros et al., 2015), further highlighting the need for an approach that considers the differences across the income distribution.

Thus, this study aims to investigate the income association patterns within couples along the income distribution in Brazil from 1995 to 2020. Specifically: i) identify trends of relative income in Brazil over the period; ii) determine how the degree of income association changes along the income distribution; and iii) understand the role of educational and age assortative mating in the trend towards economic homogamy.

To do so, two nationwide surveys developed by the Brazilian Institute of Geography and Statistics (IBGE) are used: the Continuous National Household Sample Survey (PNADc) and the National Household Sample Survey (PNAD). Couples selected from 1995 to 2019 provide the data for investigating patterns of relative income and their changes over the period and across the income distribution. Our empirical strategy includes analyzing the distribution of the relative wage gap, creating contingency tables of each spouse's marginal and joint income distributions, applying rank dependence curves, and conducting quantile regression of one member of the couple relative to the other.

This study contributes to the broader literature on changes within families and gender-related behavior, offering a Brazilian perspective alongside novel theoretical and empirical framing of the phenomenon. The investigation of the distribution of the wage gap within couples goes beyond commonly used central metrics, shedding light on patterns between genders and across the income distribution. That can be effective not only on new empirical results but also on theoretical developments. Furthermore, the spouse's income association patterns are drawn, taking into consideration changes in the country as part of the Gender Revolution over the last decades.

Besides this introduction, this paper presents a theoretical background regarding assortative mating and income association, along with a depiction of the Brazilian literature. Then, the surveys used are characterized, along with the empirical strategy. The results presentation follows, including some descriptive analysis of relative income in Brazil, the rank association curves, and finally, the results from the quantile regressions. Those also include some other characteristics of the couple that influence their income association. The paper is concluded with some final remarks, followed by an appendix section that includes some of the results used for this work.

## **2 SPOUSES' INCOME ASSOCIATION**

From the 20<sup>th</sup> century on, with the rise of male wage labor, families predominantly followed the "male breadwinner/female housework" model since the Industrial Revolution created new opportunities. Jobs for women began to emerge in the early 1900s and increased rapidly after World War II. These opportunities opened new perspectives, allowing women to delay marriage and even opt out. In the 1950s, a sharp increase in married women joined the workforce, altering the balance of power within marriages. This dual-earner family model remains predominant today (Ruggles, 2015).

As women entered the workforce, they often had lower levels of education and consequently earned lower wages. For a while, educational hypergamy prevailed, i.e., on average, couples consisted of husbands with higher educational qualifications than their wives. With the increasing schooling of women, this pattern has shifted (Esteve et al., 2016); however, women who have an educational advantage over their husbands still tend to earn less than them (Chudnovskaya & Kashyap, 2019), and income equality between the couple's members, despite its growth, has not kept pace with the educational trends. Beyond female education, reducing occupational gender segregation can also increase the chances that high-earning men match high-earning women (Blau et al., 2013).

Assortative mating, or marital selectivity (Altonji & Dunn, 1991), explores patterns of couple formation under the assumption that individuals with similar characteristics are more likely to be in a union than expected in a random mating pattern. Patterns of union with income similarity can arise from a greater tendency for individuals with similar income levels before marriage to pair up or other characteristics, such as education. It can also originate from behavioral changes after marriage or union, in response to the partner's income, as well as based on the division of household and paid labor between husbands and wives (Swartz, 2010; Ganalons-Pons & Schwartz, 2017).

In recent years, there has been an increase in educational assortative mating (Schwartz & Mare, 2005; Greenwood et al., 2014; Eika et al., 2019), indirectly contributing to the rise of economic homogamy since income is directly related to educational attainment. Furthermore, this phenomenon can originate from individuals' increased scrutiny of potential spouses based on their

current or potential earnings (Ganalons-Pons & Schwartz, 2017), and the trend toward delayed first unions facilitates the evaluation of observed and potential earnings (Billari, 2005).

Greater economic homogamy can also result from changes in family organization. Among the reasons for gender wage disparities, besides gender segregation in occupational fields and labor market segmentation, are the gender differences in allocating domestic work, care, and other family responsibilities. An individual's earnings reflect both individual productivity and the joint and endogenous decision-making regarding labor supply made at the couple level. Thus, when the shift from breadwinner to dual-earner families is accompanied by a more equal division of domestic labor, women gain time to "climb the occupational ladder." In the same way, reducing the number of children per family implies less time away from the labor market, positively affecting earnings according to the human capital theory, as less experience is sacrificed. Additionally, the theory of social capital predicts that each partner in a union can take advantage of the labor market resources of the other, such as connections, business opportunities, and economic resources, further intensifying economic homogamy (Verbakel et al., 2008).

Age is another dimension of assortative mating that influences women's outcomes in the labor market. Women tend to marry older men (Gustafson & Fransson, 2015), and the age gap between partners can influence a woman's entire career trajectory, as well as income absolute and relative to her husband. Since earnings tend to increase with age, the male partner contributes more to the family's economic resources simply because he is in another career stage. Thus, the short-term strategy to maximize family income tends to prioritize the career of the older male partner, who has accumulated more experience. Consequently, decisions that may seem optimal at the family level, such as specialization in household and caregiving tasks, may not be optimal for each partner. Therefore, the age difference can affect the bargaining power over resources, especially regarding negotiations about specialization. Nevertheless, the nature of this association appears to be complex and not constant across the income distribution and the level of age difference (Carollo et al., 2019).

Marriage patterns have important implications for social inequality by influencing the composition of the population: considering that more couples today consist of two high- or low-income partners, inequality between families (considering those formed by couples) will intensify. In this way, increasing economic homogamy contributes to increased inequality, increasing the number of

couples with two high-income or two low-income partners (Swartz, 2010; Ganalons-Pons & Schwartz, 2017). Still, as pointed out by Becker (1973), union patterns are related to the nature of intrafamily production and resource allocation decisions; in addition, female earnings influence the health and well-being of children, generate greater life expectancy, and other positive results (Duflo, 2012; Esteve et al., 2016).

Finally, it is important to consider the non-linearity of economic homogamy across the distribution since socioeconomic processes are not equal at different levels of income distribution (Shen, 2021). This issue directly affects income inequality between couples and, contrary to the traditional dimensions targeted by analyses of homogamy patterns (for example, education and age), earnings follow a highly skewed distribution to the right. Suppose economic homogamy increases equally at each income level. In that case, greater equality among high-income people produces greater inequality between couples than a similar increase among middle- or low-income people (Shen, 2021).

An increase in the positive association of earnings between spouses has been documented since the 1970s in the United States (Schwartz, 2010; Ganalons-Pons & Schwartz, 2017). Beyond the American context, some European countries also show evidence of this phenomenon, including Switzerland (Nakosteen et al., 2004), Germany (Pestel, 2017; Eika et al., 2019), the United Kingdom (Eika et al., 2019), and France (Frémeaux & Lefranc, 2020).

In Brazil, a significant research agenda is centered on understanding how union formation impacts family income distribution inequality, as Hoffmann and Kageyama (1986) and Barros and Mendonça (1989) investigated. Other research avenues aim to quantify the influence of the earnings of both spouses in couples on income distribution, such as Scorzafave and Menezes-Filho (2003) and Hoffman (2019). Additionally, some works directly investigate the impact of assortative mating, whether social, economic, or educational, on family income distribution in Brazil, such as Pereira and Santos (2017), Hakak and Firpo (2017), Ribeiro and Machado (2018), and Machado and Ribeiro (2021).

Another line of research explores the presence of marital assortative mating patterns in Brazil. Part of this literature is Silva (2003), Neri (2005), Ribeiro and Silva (2009), Longo and Miranda-Ribeiro (2012), Pereira and Santos (2017), Hakak and Firpo (2017), and Hoffmann (2019) that approach the educational assortative mating. Some results show either increasing or decreasing educational

homogeneity over time, depending on the methodology employed (decomposition, variation coefficients, etc.) and whether changes in marginal distributions, particularly concerning female labor force participation, are considered. Important contributions concerning racial assortative mating come from Ribeiro and Silva (2009), Longo and Miranda-Ribeiro (2012), and Gullickson and Torche (2014), suggesting an increase in interracial marriages in Brazil over time. Furthermore, Longo and Miranda-Ribeiro (2012) incorporate the dimension of religion into the analysis. Lena and Oliveira (2015) compare marital assortative mating patterns between heterosexual and homosexual couples based on factors like education, race, and age.

Melo (2007) explores combinations of occupational and non-occupational characteristics of the head of the household and their respective spouse in the São Paulo Metropolitan Area, revealing the substantial heterogeneity of marriages. Age, education, and economic strategies of spouses, particularly regarding the wife's labor force participation, are determining factors in distinguishing couples. The author points out that very poor wives need to reach a minimum level of family conditions to make themselves available for the labor market, whether due to the difficulty of obtaining paid employment or obtaining an income that covers the costs of being away from home and not performing household tasks. Another interesting finding is the lower correlation between years of education for younger couples and a higher correlation between the head and spouse for older couples.

Lastly, some studies for Brazil show evidence of the existence of non-linearity in assortative mating processes, although they do not directly address this issue. For example, Sedlacek and Santos (1991), using data from 1984, investigated the relationship between husband's income and women's participation in the labor market and found higher participation rates for wives of husbands at both ends of the income distribution. Hakak and Firpo (2017) find, in the last 20 years, a reduction in the pairing of the spouses' education but an increase in the pairing in couples with higher education. Furthermore, assortative mating and its effect on inequality are greater at the tail of the distribution for several countries investigated by Aaberge et al. (2019), except for South Africa and Brazil. According to the authors, observations at the bottom of the income distribution in these countries may not be representative since informal employment is difficult to measure adequately.

### 3 DATA, VARIABLES, AND METHODS

#### 3.1 Database and variables

Data used in this work comes from the *Pesquisa Nacional por Amostra de Domicílios* (PNAD) from 1995 to 2015 and from the *Pesquisa Nacional por Amostra de Domicílios Continua* (PNADc) from 2012 to 2019, both available through the Brazilian Institute of Geography and Statistics (IBGE) for the national territory. The transition from the former dataset to the latter involved an intersection period during which both surveys were conducted, serving as a compatibility measure for these datasets. The PNAD series is available for periods before 1995; however, due to the significant inflation experienced during that time, which resulted in distortions in income-related data, our analysis will be made from 1995. Similarly, although PNADc data is available post-2019, that period will not be considered due to labor market distortions caused by the COVID-19 pandemic.

The sample of analyses includes heterosexual couples living in urban areas where both partners are between 25 and 49 years old, considering most of the working time span of one's lifecycle. Only couples where one of the partners was identified as the reference for the survey interview are included to ensure the accurate identification of couples. Also, same-sex couples are excluded due to differing gender dynamics and limitations in the available database. Finally, married couples or in unions are included indistinctly as these unions are often considered almost indistinguishable in Brazilian society<sup>6</sup>.

Although both the PNAD and the PNADc provide information on different sources of income, such as capital gains, social benefits, and retirement, the primary focus is on income derived from work<sup>7</sup>. Therefore, the monthly wage from the partners' main job is the principal variable obtained from the databases.

Additionally, we incorporate other individual variables to characterize and control for factors influencing relative income. Both partners' ages are considered to test the hypothesis that life cycle factors play a role in this phenomenon. Furthermore, we investigate the relationship between age homogamy and income disparity, so the age gap between spouses is also included (specifically in

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<sup>6</sup> The terms "partners", "spouses," and "wives/husbands" are used interchangeably.

<sup>7</sup> Rather than considering all employments, the use of the primary occupation is to encompass aspects of social status associated with the main occupation. Similarly, monthly wages are analyzed rather than hourly wages.



the format of the husband's age minus the wife's age). The individual age is a discrete variable in five-year intervals (25 to 29, 30 to 34, etc.). This format already accounts for non-linearity, eliminating the need for adding quadratic terms.

Similarly, education is integrated into the analysis both as a gap and at the individual level for women. The education gap is represented as a continuous variable in years of study. In contrast, the individual's level of education is categorized to capture the highest level completed: Complete Elementary Education 1 (up to 7 years of study), Complete Elementary Education 2 (8 to 10 years of study), Complete High School (11 to 14 years of study), or Complete Higher Education (15 or more years of study).

Including variables that capture education and the life cycle of the partners is crucial, as these factors are intertwined with both individual and family demographic processes and labor market determinants. Work experience, often proxied by age, and skills or human capital, proxied by years of schooling, are fundamental in determining the returns to the labor of husbands and wives. Additionally, age is correlated with significant life events, particularly for women, that influence labor supply and potential remuneration, such as parenthood (Bianchi et al., 1999).

### 3.2 Empirical strategy

The first part of the work employs a descriptive methodology, including the relative wage gap. The following analyses have a rank-based approach, starting with the contingency table of the marginals and joint distributions of each of the spouses' work incomes. Additionally, respective rank dependence curves are obtained. Finally, a quantile regression of the rank of one member of the couple to the other is applied to isolate other influence factors. The analysis includes only couples where both partners earn positive wages unless otherwise specified. The scope of this analysis encompasses the first and last years of the sample, 1995 and 2019, and the omission of the intermediate period is found not to harm the argument to be made.

#### *Distribution of the relative wage gap*

The initial analysis focuses on the relationship between the wages received by the partners. An index is employed to determine the magnitude of the gap relative to the couple's combined income, referred to as the relative wage gap.

$$\text{Relative wage gap} = \frac{W_m - W_w}{W_m + W_w} \quad (1)$$

Where  $W_m$  is the male wage and  $W_w$  is the female wage. The index also can be interpreted as the difference between the husband's and wife's relative contributions to the total earnings of the couple (Bianchi et al., 1999)

This measure of income association is continuous and can assume values in the -1 to 1 range. A value of 0 represents equality between the husband and wife in earnings, while a negative value means that the women earn more than the men, and a positive one indicates an advantage in male earnings. Examining the distribution of the relative wage index provides valuable insights into the income dynamics within dual-earning Brazilian couples. It is important to view the gap as a fraction of the income since the same nominal difference can represent different levels of asymmetry.

#### *Rank-based association*

An income-based measure is susceptible to income levels, which can change over the years of analyses. Additionally, comparing the income levels of husbands and wives can be misleading, given the inherent differences in the wage distributions of men and women (with men typically earning more on average). In that case, an income gap can result from this phenomenon and not characterize a difference in positions on the social scheme. Using ranked labor income is beneficial to address these issues, as it captures the relative positions within the income distribution.

This rank-based income is applied to a contingency table showing the association between the marginal distribution of each spouse and the joint distribution and between both marginal distributions. Both men and women are classified into deciles based on their labor income ranks, allowing for the tracking and matching of individual' marginal and joint deciles. This approach enables the identification of the proportion of individuals, by income decile, who remain in the same decile, move up, or move down the income distribution concerning the joint distribution, i.e., considering the shared income among partners. That could be understood as a proxy for “mobility” due to marriage (Yonzan, 2020). On the other hand, the contingency table of the marginal distribution of males versus females illustrates the relative income positions of couples. This approach allows for non-linearities in the income distribution to be observed, and the bigger such mobility is in a decile, the less homogeneous the spouses' earnings are within that income bracket.

#### *Rank association curve*

Another way to identify how earnings association in couples varies along men's and women's distribution of earnings is through rank dependence curves. These curves show how a wife positioned at a given percentile of her earnings rank distribution is correlated to their husband's rank in a non-linear way and vice-versa (Grossbard et al., 2022)<sup>8</sup>.

The methodology is based on a binning technique, and for each bin based on a wife's (or husband's) income ranks, the average income rank of their spouse is calculated. Binned means are useful to capture non-linearities, which may not be adequately addressed by the more commonly applied method of correlation coefficients. If the average rank of a wife (husband) varies non-linearly with the husband's rank, to have a visual representation, within each bin, a non-linear function of the spouse's income rank is plotted, consisting of a continuous and smooth way of displaying the information.

The rank association structure of the spouse's income is estimated using a continuous mean function of the wife's (husband) rank, applying a polynomial function of the partner's rank:

$$r_{w,i} = \alpha + \sum_{k=1}^K \beta_k r_{h,i}^k + e_i \quad (2)$$

The element  $r_{w,i}$  represents the wife's (husband) income rank for the  $i^{th}$  family, and  $r_{h,i}$  is her husband's (his wife's) rank. This equation produces a continuous mean function. Plotting the function, using the estimated ranks and coefficients, has flexibility introduced by the polynomial functional form, allowing the visualization of a possible non-linear association pattern along the income rank distribution.

#### *Quantile regressions of marginal ranked income*

In addition to descriptive analyses and the distribution of the gap between couples, it is important to apply methods that isolate the factors that influence the income ratio within couples. Quantile regressions (Koenker & Basset, 1978) are estimated to provide measurements of the impact of the explanatory variables on the different points of the conditional distribution of the dependent variable.

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<sup>8</sup> The set of male and female rank association curves are presented for 1995 and 2019. Besides that, they are also calculated for 2012 using two datasets, Pnad and PnadC, to ensure the minimum compatibility between them. They are presented in the supplementary material.

The choice of applying quantile regressions is justified by the possibility of characterizing the entire conditional distribution of the response variable, given a set of regressors. Moreover, quantile regression estimators can be more efficient than least squares when errors do not follow the normal distribution. Also, different solutions at different values can be interpreted as differences in the response of the dependent variable to changes in the regressors at various points in the conditional distribution of the dependent variable.

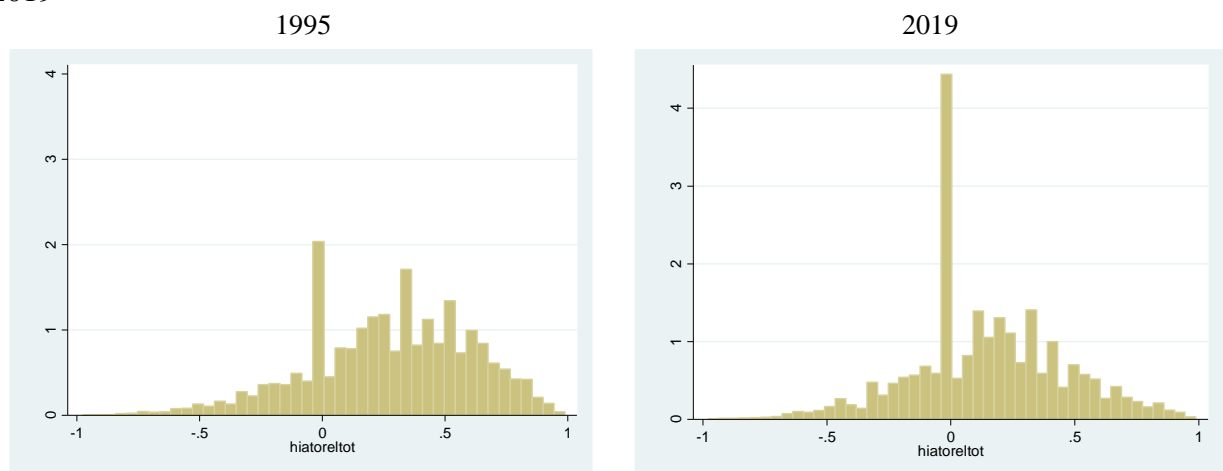
Quantile regressions are used to model the relationship among the independent variable, the male position in the income rank, and the control ones in different points of the conditional distribution of the dependent variable  $y$ , the female income rank. Nine deciles were estimated,  $\theta = \{0.1, 0.2, 0.3, 0.4, 0.5, \dots 0.9\}$ .

## 4 RESULTS AND DISCUSSIONS

### 4.1 Spouses relative wage gap

The investigation of the association of labor earnings within couples starts by examining the concept of the relative wage gap: that is, the share of the income that the difference of the partner's labor income represents in favor of the male partner. Figure 1 displays the distribution of this index for the years 1995 and 2019. The right skew indicates that, more frequently, the husband is the higher earner within the couple.

Figure 4 – Distribution of the relative wage gap among dual earners couples, Brazil, 1995 and 2019



Source: Authors' calculation using PNAD and PNADc.

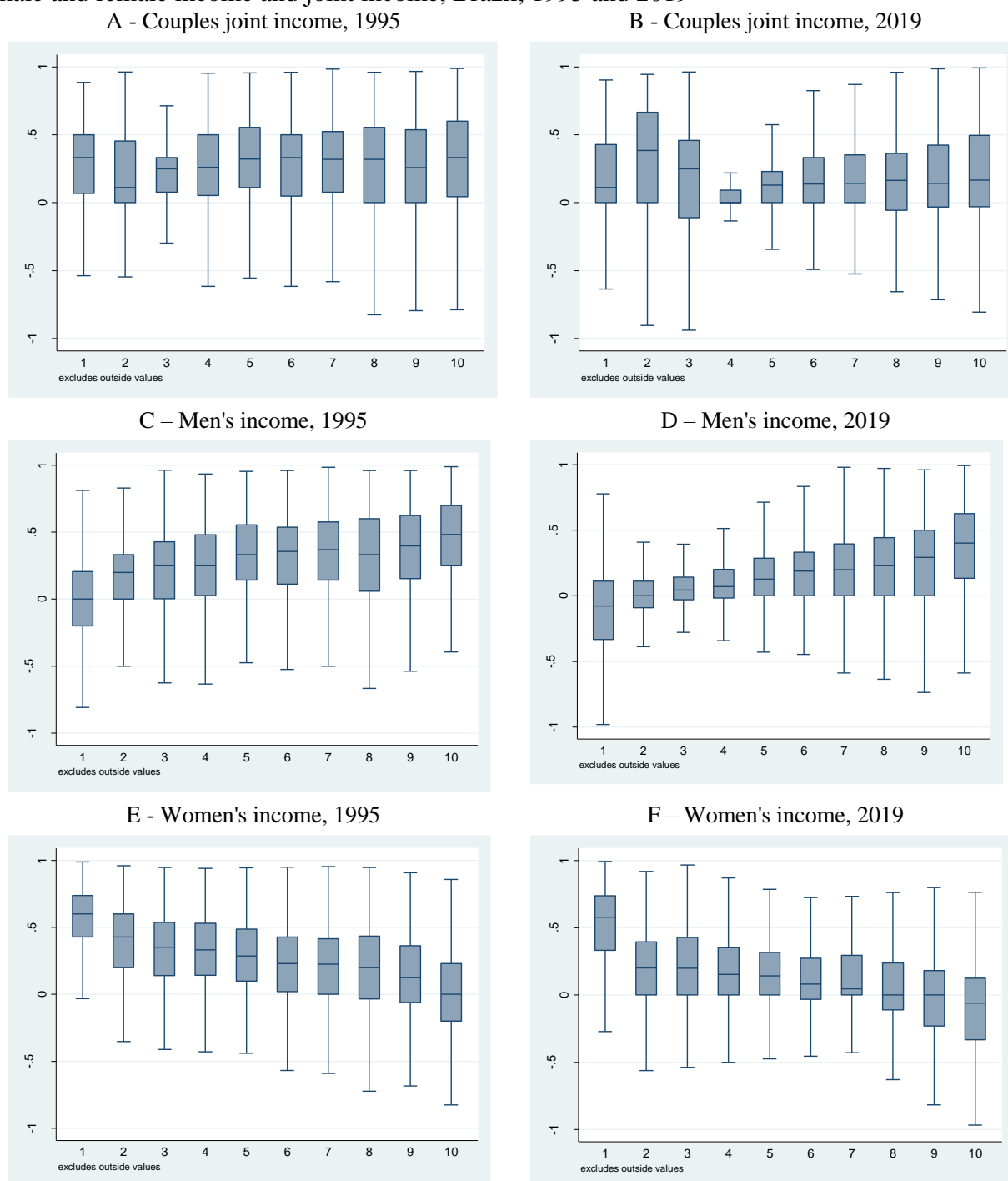
In addition to its asymmetric concentration in positive differences, the partners' wage gap distribution is centered around zero. The mode is the zero-difference bin, where the partners earn the same income. This outcome is nearly twice as frequent in 2019 compared to 1995. Furthermore, there is also a change in the format on the positive side of the distribution, with the secondary frequency peak getting closer to the center. Over almost two and a half decades that separate the first histogram from the second, more significant changes occur on the positive side of the spouse's relative wage gap, specifically in cases where men earn more than women. It is evident that there is a trend towards equalizing the relative income of partners, but primarily when wives still earn less than their husbands. Similar patterns have been noted in other contexts, such as the United States (Bertrand et al., 2015).

To identify variations in the association of spouses' income across different earnings levels, Figure 2 illustrates the mean relative wage gap index by deciles of earnings, considering three reference points: couples, husbands, and wives deciles of income.

Some non-linearity is present when observing the mean relative wage gap by decile of joint labor income (Figure 2 A and B). The most significant gap in 2019 is observed within the second decile, after which the gap average decreases and remains relatively consistent from the middle to the upper end of the distribution. Notably, the second decile is the only one where there is not a decrease in the median relative wage gap between the two years. Another important feature is the median, which has a value of 0 in decile 4.

The distribution of the relative wage gap by the men's income decile (Figures 2 - C and D) shows a linear and positive relationship between the wage gap index and the income decile, i.e., the higher the husband's income, the greater the gap. Between the two periods of analyses, the median in all the deciles decreased, and there was also less dispersion in the second year. The first decile, especially, has a negative mean, with women earning more than men and with greater variability. This suggests that in couples where the husbands have the lowest labor income, a greater degree of "equality" in the partnership is achieved, even reaching a level of income asymmetry in favor of women, likely driven more by economic precarity than attitude shifts.

Figure 5– Box plot representation of relative wage gap among dual earners by decile of marginal male and female income and joint income, Brazil, 1995 and 2019



Note: The box represents the values from the 25<sup>th</sup> to the 75<sup>th</sup> percentile, and the central line of the box is the median. The whiskers show the index's upper and lower adjacent values of the relative wage gap.

Source: Authors' calculation using PNAD and PNADc.

On the other hand, when considering the wage gap by women's income (Figure 2 - E and F), an inverse association is observed: the higher the wives' wage, the smaller the wage gap. From 1995 to 2019, the median in all the deciles has also decreased, along with reduced dispersion. In the last decile, representing the top 10% of married women in terms of labor income, the median relative wage gap is negative, indicating that these women earn more than their husbands.

In all three points of viewing the spouse's relative income, there is still a more frequent positive difference in income in favor of the male partner, even if that difference has reduced from 1995 to 2019. The improvement during this period is more about reducing wage disparity than an increase in cases where women earn more than men. These findings support the notion that the relationship is becoming more equal, in the sense that the wage gap is getting smaller until women earn less than their husbands. In Brazil, “*women are also bringing personal glass ceilings from home to the workplace*” (Bertrand et al., 2015).

It appears that another strategy couples use to ensure the desired gender income balance is by creating or maintaining the unions only if the partners have the right balance of earning potential. In that sense, this attitude towards gender traditionalism, like the belief that “a man should earn more than his wife”, influences not only the distribution of relative income within households but the patterns of marriage and divorce, women’s labor force participation, and the division of household activities among husbands and wives (Bertrand et al., 2015; Fortin, 2005).

#### 4.2 Analysis based on gender-specific earnings rank and joint income rank

Income-based measures of association can be susceptible to changes in income levels and may be misleading when dealing with different marginal wage distributions. In such cases, ranked measures of labor income are useful as they allow the measurement of the association between partners' income, capturing the positional correlations.

Tables 1 and 2 show the marginal distributions of women and men, respectively, versus the joint income decile for 1995 and 2019. These display the income “mobility” that occurs through marriage. Individuals and couples are ranked from the poorest to the richest, dividing them into ten bins based on income and then determining the frequency of each match. The diagonals of the

tables indicate immobility, i.e., the men and women that stay in the same income decile considering both their individual and couple incomes.

Table 11 – Match between marginal and joint incomes ranks of women, Brazil, 1995 and 2019 (%)

		Women - 1995									
Couple		1	2	3	4	5	6	7	8	9	10
1		<b>51.45</b>	27.45	15.3	5.2	0.46	0	0	0	0	0
2		17.25	<b>21.74</b>	28.38	18.33	7.49	1.95	0.12	0	0	0
3		11.13	18.66	<b>18.87</b>	21.19	17.64	8.37	1.52	0	0	0
4		8.91	12.51	13.37	<b>18.17</b>	22.2	18.7	5.25	0.07	0	0
5		5.13	7.08	8.92	17.87	<b>17.25</b>	24.96	17.33	2.69	0	0
6		2.91	5.03	6.09	7.77	16.86	<b>19.51</b>	23.75	11.43	0.62	0
7		1.98	4.1	5.79	6.18	8.14	13.9	<b>24.45</b>	25.93	7.46	0
8		0.56	1.61	2.08	4.07	6.18	7.4	15.87	<b>31.46</b>	31.69	4.31
9		0.43	1.22	1.04	1.06	2.6	4.23	7.82	19.08	<b>39.15</b>	26
10		0.25	0.59	0.15	0.15	1.17	0.98	3.91	9.32	21.08	<b>69.7</b>
		100	100	100	100	100	100	100	100	100	100
		Women - 2019									
Couple		1	2	3	4	5	6	7	8	9	10
1		<b>63.75</b>	15.	4.07	2.69	0.96	0.37	0.01	0	0	0
2		12.34	<b>33.25</b>	30.91	16.13	3.25	1.22	0.24	0	0	0
3		8.16	17.33	<b>21.8</b>	25.2	18.29	6.13	1.24	0.14	0	0
4		4.74	12.52	16.63	<b>19.38</b>	24.9	15.97	6.65	0.68	0.01	0
5		4.02	8.1	8.93	14.42	<b>20.97</b>	28.61	16.92	5.18	0.2	0
6		2.44	5.62	7.45	9.37	12.55	<b>18.29</b>	27.47	14.45	1.96	0
7		1.92	3.31	3.82	5.91	9.44	14.25	<b>21.58</b>	28.86	10.79	0.05
8		1.18	2.27	3.41	4.01	5.32	8.44	14.24	<b>27.25</b>	29.95	3.33
9		0.93	1.36	1.92	2.06	3.13	4.85	8.1	16.4	<b>40.24</b>	25.27
10		0.52	0.6	1.05	0.83	1.19	1.88	3.56	7.04	16.87	<b>71.36</b>
		100	100	100	100	100	100	100	100	100	100

*Notes:* This table shows the "mobility-by-marriage" frequencies of women moving from their respective labor income decile to the couple's. The deciles are ranked from the lowest, 1<sup>st</sup>, to the highest, 10<sup>th</sup>. In bold are those with the same rank individually and when considered with their partner.

*Source:* Authors' calculation using PNAD and PNADc.

Among women, there is a prevalence of situations where the individual income decile is higher than when considering the couple's combined income. Take the example of the fifth decile of female income distribution: in 2019, 24% of women in this decile belong to the fourth decile when we consider the income of both partners, the higher share. Similarly, approximately 21% of women remain in the same income category when viewed from both perspectives.

The first and last deciles are the ones that exhibit the highest matches between the woman's and the couple's income decile. Remarkably, this occurrence is more frequent at the last decile. In 2019,



96% of women in the top 10% income bracket remained within the top 20% when considering the couple's combined income. On the other hand, among women with lower individual incomes, it is observed a more diverse distribution across various income levels within the couple, and in 2019, 7% of women in the lowest income decile found themselves in the more privileged half of the couple's income distribution.

Table 12 - Match between marginal and joint income ranks of men, Brazil, 1995 and 2019 (%)

		Men - 1995									
Casal		1	2	3	4	5	6	7	8	9	10
1		<b>76.74</b>	25.13	0.87	0	0	0	0	0	0	0
2		14.65	<b>40.41</b>	26.06	3.13	0.24	0	0	0	0	0
3		3.91	21.24	<b>35.14</b>	33.68	7.2	0	0	0	0	0
4		1.92	5.96	23.07	<b>32</b>	33.69	3.83	0	0	0	0
5		1.14	3.01	9.56	18.44	<b>32.56</b>	33.85	4.78	0	0	0
6		0.71	2.38	2.7	7.22	16.07	<b>35.89</b>	33.96	0.83	0	0
7		0.43	1.3	1.25	2.97	6.96	19.17	<b>39.03</b>	29.61	0.23	0
8		0.28	0.26	0.58	1.68	2.74	5.95	18.75	<b>48.07</b>	27.47	0
9		0.14	0.26	0.77	0.8	0.54	1.22	3.11	19.56	<b>57.12</b>	18.52
10		0.07	0.05	0	0.08	0	0.08	0.36	1.93	15.18	<b>81.48</b>
		100	100	100	100	100	100	100	100	100	100
		Men - 2019									
Casal		1	2	3	4	5	6	7	8	9	10
1		<b>55.14</b>	20.33	8.25	1.72	0	0	0	0	0	0
2		31.17	<b>42.82</b>	12.87	8.55	2.36	0.05	0	0	0	0
3		5.46	20.45	<b>43.21</b>	20.2	7.46	2.17	0.07	0	0	0
4		3.06	6.82	19.77	<b>34.74</b>	24.82	6.71	1.44	0	0	0
5		1.77	4.05	7.36	21.14	<b>30.54</b>	30.98	8.21	0.61	0	0
6		1.39	2.3	4.05	6.06	20.45	<b>27.15</b>	30.36	6.79	0.04	0
7		0.9	1.64	2.26	3.79	7.93	21.23	<b>30.46</b>	32.07	2.97	0
8		0.59	0.92	1.47	2.35	3.96	7.62	21.19	<b>35.86</b>	28.87	0.04
9		0.38	0.42	0.62	1.15	2.02	3.27	6.96	21.3	<b>52.37</b>	18.49
10		0.14	0.25	0.15	0.31	0.45	0.82	1.31	3.37	15.75	<b>81.47</b>
		100	100	100	100	100	100	100	100	100	100

Notes: This table shows the "mobility-by-marriage" frequencies of men moving from their respective labor income decile to the couple's. The deciles are ranked from the lowest, 1<sup>st</sup>, to the highest, 10<sup>th</sup>. In bold are those with the same rank individually and when considered with their partner.

Source: Authors' calculation using PNAD and PNADc.

There has been an increase in the likelihood that women stay in the same decile of their marginal distribution compared to 1995 and 2019, especially at the distribution's tails. For the poorest women, this value went from approximately 51% to 64% in the period, 17% to 21% in the fifth

decile, and decreased between the sixth and eighth deciles. This pattern of decreasing mobility after marriage among the poorest women is similar to what Yonzan (2020) documented for the U.S.

Men exhibit a great correspondence between their individual and couples' income ranks. Except for the sixth decile of 2019 and the fourth of 1995, the most frequent category is the equivalence between the individual and joint classification. In the male case, the top income decile also stands out for its higher level of correspondence. In 2019, 81% of the men with the best incomes were also in couples with the best incomes; this figure is 55% of men with lower incomes.

The trend over time in the matching between individual and couples' income rank differs for men and women. Except for the third and fourth deciles, there was a decrease in the male's likelihood of staying in the same decile of the marginal and joint distributions between 1995 and 2019, especially on the lower end of the distribution. For the first decile, this likelihood decreased from approximately 77% to 55% in the period, 32.5% to 30.5% in the fifth decile, and stayed stable at the 10<sup>th</sup>, 81.5%.

The greater correspondence between the income rank of the individual and that of the couples for men is expected, as they earn more on average than women, and male income represents a larger share of the family income. This is especially true for the 10% higher income men, as approximately 81% are also in the 10% of the couple's income, which remained constant between 1995 and 2019. The first decile presents a different pattern; it is the only one where the immobility rate is higher for women (63%) than for men (55%), and upward mobility through marriage is more frequent for the poorest man than for the poorest women in 2019.

To better understand the pattern of matches, we can examine the distribution of both husbands' and wives' marginal incomes (Table 3). A match in the male and female ranks is most frequent only at the beginning and end of the income distributions of 2019 (deciles 2, 9, and 10), but not among the 10% lowest income men. In this decile, it is more common to pair with women from the second decile, a difference of almost seven percentage points. In the other deciles, the higher frequency lies near the diagonal, with lower maximum frequency values and the wives occupying higher income ranks. It is important to clarify that this does not mean the woman is earning more than the husband in absolute terms, only that she occupies a higher position in the income ranking of all married women in a double-earner couple than he does in the men's rank.

Table 13 - Match between marginal income ranks of women and men, Brazil, 1995 and 2019 (%)

		Men - 1995									
Women		1	2	3	4	5	6	7	8	9	10
1		<b>31.17</b>	21.13	13.59	15.52	7.71	6.02	4.08	3.65	2.19	2.37
2		28.99	<b>25.3</b>	19.2	15.85	13.20	8.52	6.24	5.41	3.22	2.93
3		17.87	17.86	<b>18.41</b>	18.20	12.75	13.37	7.77	4.75	4.1	1.62
4		3.94	6.70	6.14	<b>5.57</b>	5.54	5.01	1.92	2.41	2.41	1.31
5		7.34	13.84	13.94	12.74	<b>16.96</b>	10.03	9.02	7.53	5.93	2.43
6		3.94	5.95	14.56	11.99	15.42	<b>17.13</b>	13.76	11.48	7.02	5.23
7		3.19	5.06	6.58	11.35	11.47	16.46	<b>13.96</b>	15.13	7.46	8.84
8		1.60	2.23	4.30	4.93	9.99	13.37	16.93	<b>13.89</b>	17.41	9.53
9		1.54	1.49	2.15	3.00	4.50	7.18	20.00	18.35	<b>22.38</b>	20.98
10		0.43	0.45	1.14	0.86	2.47	2.92	6.33	17.4	27.87	<b>44.77</b>
		100	100	100	100	100	100	100	100	100	100
		Men - 2019									
Women		1	2	3	4	5	6	7	8	9	10
1		<b>33.42</b>	15.72	9.92	10.23	7.32	5.96	4.50	3.58	2.90	1.84
2		40.77	<b>24.24</b>	18.52	15.80	13.23	11.25	9.50	6.81	4.87	1.41
3		3.05	17.67	<b>8.16</b>	5.31	6.58	5.29	5.31	3.70	3.38	2.71
4		5.79	17.13	12.27	<b>14.9</b>	9.99	9.86	6.12	5.99	4.48	1.63
5		5.72	9.38	28.24	19.17	<b>16.43</b>	18.71	14.61	11.39	7.99	4.12
6		2.52	4.08	5.31	15.16	9.88	<b>8.85</b>	7.33	6.46	4.26	1.74
7		3.52	4.58	6.17	7.51	19.21	10.41	<b>13.95</b>	13.68	10.54	6.78
8		2.63	3.99	5.98	6.61	9.00	19.1	23.71	<b>17.26</b>	17.30	12.37
9		1.92	2.13	4.10	3.50	5.94	8.02	9.45	22.37	<b>26.95</b>	20.56
10		0.67	1.09	1.33	1.81	2.43	2.56	5.51	8.75	17.34	<b>46.83</b>
		100	100	100	100	100	100	100	100	100	100

Notes: Deciles are ranked from the lowest, 1<sup>st</sup>, to the highest, 10<sup>th</sup>. In bold are those with the same rank as their partner.

Source: Authors' calculation using PNAD and PNADc.

There appears to be an asymmetry in the partners' income association by gender. Men more frequently match with a woman in a "distant" income decile, i.e., they form couples with more diverse ranked women. That diversity, however, happens more frequently in the top, or right, triangle of the contingency table, where are the cases that the husband outranks the women. From the female perspective, there is less frequency of matching with lower ranked men, or, in other words, they are less prone to matching in greater inferior distances<sup>9</sup>.

<sup>9</sup> This behavior is also part of the reason for the biggest frequencies in the middle of the rank distribution to be in the women outranking the husbands. It is a feature that comes from the ranking methodology.

Some changes can be identified between the years of analyses. The first one is a bigger frequency spread, indicating less concentration. Also, apart from the extremity income deciles, the middle deciles (5,6,7) previously had the highest frequency of rank matches by decile. Also, in 1995, the decile rank homogamy was more frequent in the top decile, 44.7%, than at the bottom, 31.2%. Finally, the asymmetry in the association of partners' income by gender, where it is more common for a man to partner with a woman from a distant decile than a woman, especially in situations favoring women's income, was also present in this first year of analysis.

Overall, these results suggest greater diversity in pairing in the middle of the distribution, with the top being more uniform than the bottom. The match probability of a man in the last decile with a woman who outranks him is increasing. There is also a tendency for less homogeneity in unions from the men's point of view but not from the women's, a result like what Yonzan (2020) found for the U.S.

#### 4.3 Rank association curves

Figures 3 and 4 illustrate the rank association structure of wives and husbands as a function of their respective spouses' ranks for 1995 and 2019. Figure 3 includes all couples, while Figure 4 considers only couples with dual incomes. The y-axis shows the woman's rank in a global sense in charts B and D (man's rank in A and C), i.e., her (his) position in the distribution of all female (male) spouses employed in that year. The curves represent the local rank position; each curve is a decile.

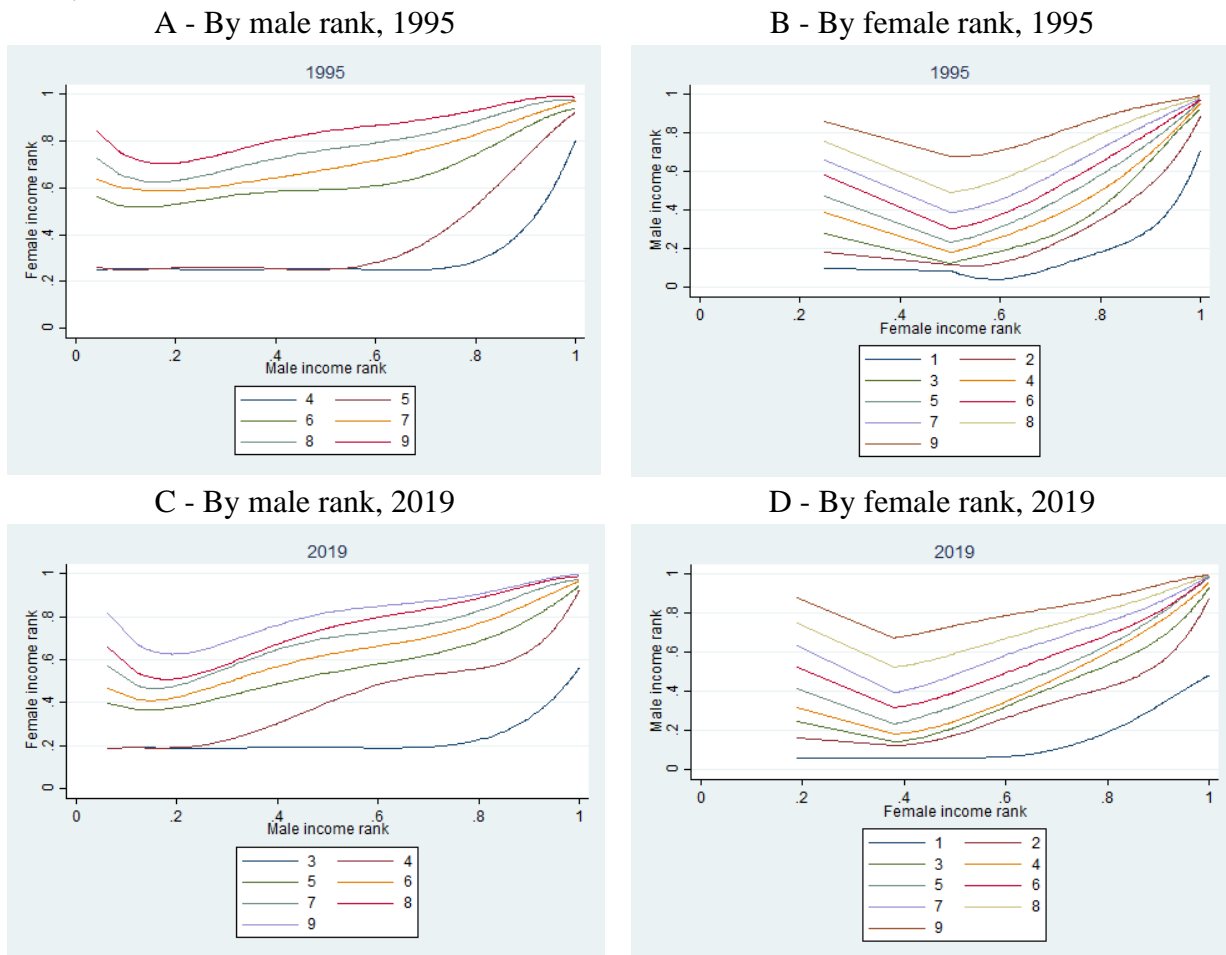
An example of interpretation can be useful for a clear understanding of these curves. On the graphic that shows the women's rank association as a function of male's rank for 2019 (D), the curve labeled 4 takes men that are locally at the fourth decile of men's earning distribution for a specific women's rank. Looking at a woman with a women's rank of 90 (on the x-axis), we know that his spouse is locally in decile 75, i.e., has a rank of 75 among the subset of spouses married to women ranked around 90. The wife who is locally at decile 9 (earning more than 90% of other women also married with man at 40%) is globally around the decile 80.

Also, it is important to clarify that the rank of women at the bottom 30% (D1-D3) for 1995 and 1 and 2 for 2019 are not correlated with their husband's rank as they are out of the labor market and

have zero earnings. This lack of income is also why there is a lack of observation points in Figures B and D since the poorest women married to men in all deciles have zero income.

The slope of the curves can assess the association between earnings: locally positive slopes indicate a local positive earnings association, flat curves suggest no correlation, and negative slopes signify a local negative earnings association (Grossbard et al., 2022).

Figure 6 - Rank association curves of spouses' income, including spouses with zero income, Brazil, 1995 and 2019



Source: Authors' calculation using PNAD and PNADc.

The curves show high levels of non-linearity in spouses' income association in both periods. A slope analysis shows that for wealthier men, there is a positive association between spouses' earnings, while for the poorest ones, the association is negative (Figure 3 - A and C). This sorting is more pronounced for men with high local earnings rank, with the biggest negative correlation. In the other extremity, the lower the local rank position, the bigger the positive correlation (decile 3 is the most step slope). This positive association characterizes all couples with rich women but

is least pronounced for rich women married to the wealthiest men (e.g., men in decile 9). The curves were flatter in 1995, indicating that the association between incomes increased.

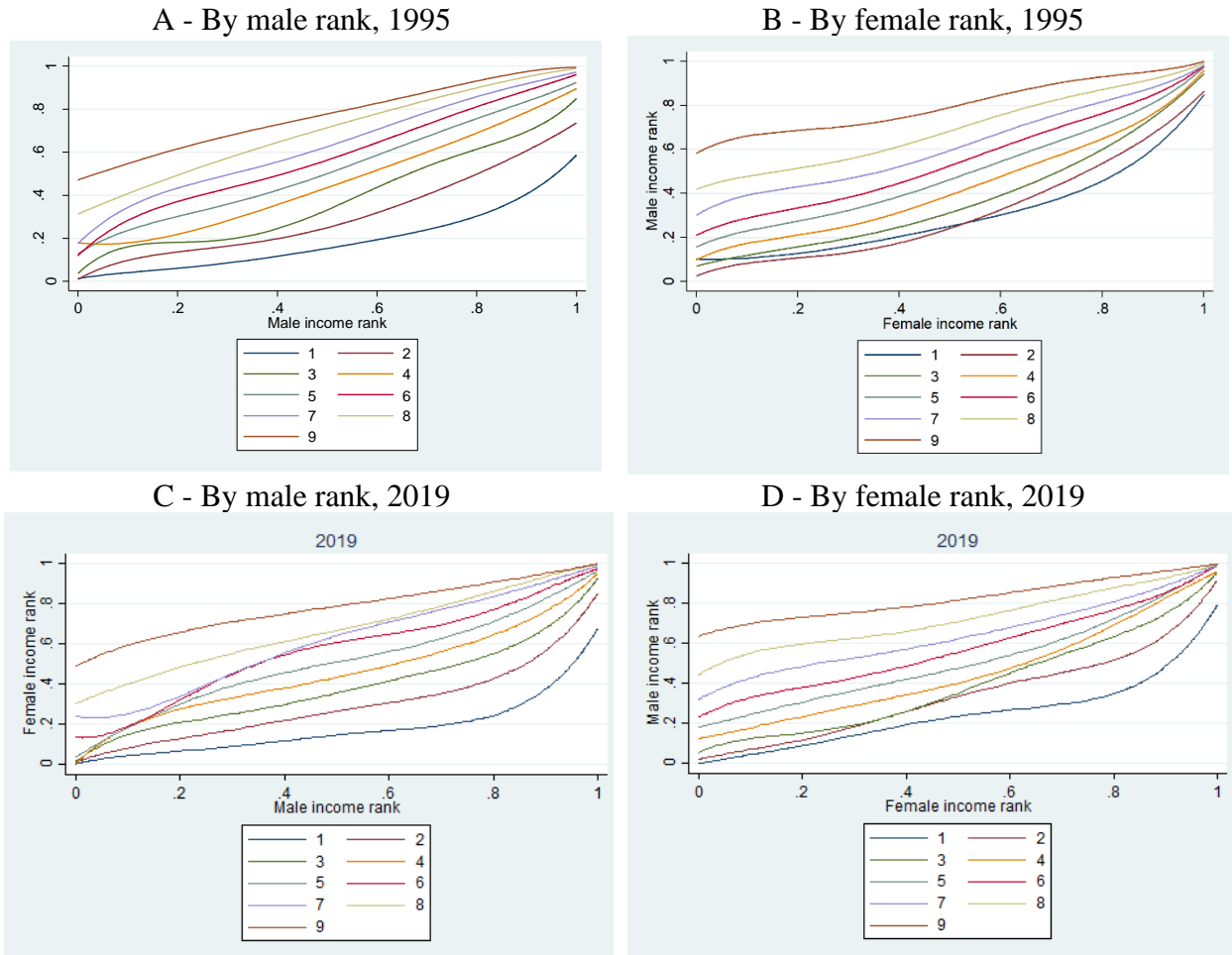
A similar analysis can be conducted by changing the axis, as in Figures 3- B and D, which use female rank as the starting point on the horizontal axis. The slope analysis shows a similar pattern to the male case, with a positive association between spouses' earnings for wealthier women and a negative association for the poorest women. A positive association characterizes all couples with high-wage men but is least pronounced for rich men married to the wealthiest women (e.g., women in decile 9). In contrast, for poor men, especially those in the bottom 20% of the distribution, the slopes of the rank association curves are negative, indicating negative sorting. In this case, there is little change between the years, with the main difference being the lower inflection point on the income distribution in the last year: those in the bottom 50% in 1995 and 40% in 2019 of the distribution had negative sorting of their spouse's income rank.

This discontinuity pattern among the poorest individuals goes with those found in the previous sections (Figure 3, for example). When both spouses are low educated, the need for income is confronted with low earnings expectations and low opportunity costs, as well as the costs associated with outsourcing care and household work. These act as opposing forces on the probability of employment (Klesment & Van Bavel, 2017). The opportunity cost effect usually predominates for women, while the income effect prevails for men (England, 2010). England states, *"There is no monotonic relationship between a partner's earnings and a woman's employment; at top levels of his income, her employment is deterred. However, women whose male partners are at middle-income levels are more likely to be employed than women whose partners have very low or no earnings, the opposite of what the "need for income" principle suggests."* (England, 2010, p. 153). In a recent work investigating the Brazilian case, Machado and Ribeiro (2021) also found the employment levels for partnered women to have a non-linear association across the husbands' earnings distributions.

Notably, there are significant differences in the association curves when considering only couples with dual positive incomes (Figure 4) as opposed to all couples from the sample. Firstly, no negative association is found when considering double-earner couples. It appears that the previous negative association was related to the income effect of pooling income from a partnership, which could lead to an exit from the labor market. However, more pronounced income associations still

exist at the extremes of the distributions, but in this case, it only represents a positive income association. Finally, there is less change in this subset of couples over the analyzed period.

Figure 7 - Rank association curves of spouses' income, including only spouses with positive income, Brazil, 1995 and 2019



Source: Authors' calculation using PNAD and PNADc.

Additionally, it is important to highlight that the lower the local rank of both men and women in the wealthiest part of the distribution, the steeper the curve and the greater the positive correlation. The behavior on the poorest side of the distribution is less clear, with some local curves almost indistinct from others. Spouses at the highest local rank curve, i.e., men or women locally at the highest decile of earning distribution for a specific spouse's decile ran, present almost constant earnings association, regardless of their partner's global income position.

An increase in the positive income sorting among partners is more clearly found in the analyzed period, also documented by Schwartz (2010), Goncalons-Pons and Schwartz (2017), and Eika et al. (2019), when couples including a zero-income spouse are considered. In that case, an important

negative association of income is also observed, particularly when one of the partners has a low rank. In that case, as also found in the U.S. by Grossbard et al. (2022), the negative association happens independently of the spouse's gender with a high or low earning rank, whether the husband or the wife. These authors point out that this means that “...while specialization within the household (...) is still present in some families, it has become gender neutral, almost completely overriding the traditional family model of the male breadwinner...” (Grossbard et al. 2022, p. 622).

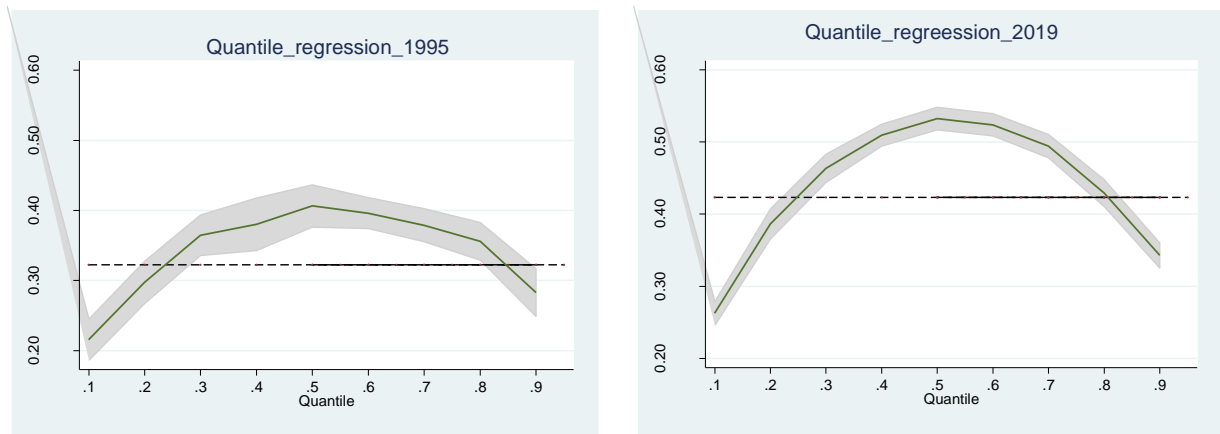
#### 4.4 Quantile regressions of the spouses` income-based rank

Some characteristics of the couples are influential in the spouse's income association. For example, age and educational assortative mating are well documented in the literature as impacting the labor market offer and results (Eika et al., 2019; Greenwood et al., 2014). To isolate this influence in the relative income of partners and maintain a non-linear approach, a quintile regression of the women's income rank is applied. In addition to the husband's income rank, the woman's age, the age gap between partners, her schooling, and the schooling gap are used as covariates. Figure 5 presents a plot of the obtained coefficients for the influence of the husband's income rank on the wife.

First, the association between women's and men's rank position is statistically significant and positive in all the deciles estimated. This finding corroborates the ones from the other methods, stating a positive association among partners' income. Also, it has a very distinct U-inverted shape along the income distribution. In both years, until the fifth decile, the higher the husband's income ranks, the higher the association, and, from that point on, the association remains positive but with a smaller coefficient. However, this U-inverted is not symmetrical, and in both years, the association is weaker at the beginning of the distribution, i.e., for the poorest women, the association is weaker than the association on the richest women side of the distribution. Approximately between the 25<sup>th</sup> percentile and the 80<sup>th</sup>, the association is above average, reaching a maximum in the fifth decile. The results found for 1995 and 2019 are very similar in shape, with a slight increase in the coefficients in the latter year, indicating a greater relative income association at all income levels.

Figure 8 – Quantile regression coefficients of the husband’s income rank on the wife's income rank, Brazil, 1995 and 2019





Source: Authors' calculation using PNAD and PNADc.

Table 4 presents the results for selected quintiles of the regressions (the complete set of results is on the supplementary material). The age gap has a negative impact on women's income rank. While the effect is not large, it is statistically significant and consistent across all deciles in 2019 and more pronounced for the first half of the distribution in 1995. Each additional year that the husband is older than the wife has a negative impact on her income. This effect, however, seems to have decreased from one year to the other. The woman's age also positively affects income in terms of the human capital theory (except for the first quintile of 1995).

Table 14 - Quantile regression coefficient of the female income rank, Brazil, 1995 and 1995

	1995						2019					
	q10		q50		q90		q10		q50		q90	
Rank men	0.190	***	0.431	***	0.327	***	0.262	***	0.533	***	0.342	***
Age gr 7	-0.007		0.008		0.005		0.020	**	0.018	***	0.019	***
Age gr 8	0.003		0.026	**	0.016	*	0.032	***	0.026	***	0.035	***
Age gr 9	0.015	**	0.030	**	0.018		0.030	***	0.034	***	0.044	***
Age gr 10	-0.001		0.038	***	0.037	***	0.046	***	0.053	***	0.059	***
Age gr 11	-0.028	*	0.030	*	0.038	**	0.033	**	0.049	***	0.067	***
Age diff.	-0.002	*	-0.002	***	-0.002	***	-0.001	**	-0.001	**	-0.001	***
Educ. gr 2	0.029	***	0.067	***	0.086	***	0.011		0.050	***	0.070	**
Educ. gr 3	0.047	***	0.140	***	0.181	***	0.027	***	0.081	***	0.122	***
Educ. gr 4	0.149	***	0.275	***	0.231	***	0.063	***	0.163	***	0.210	***
Educ. gr 5	0.482	***	0.406	***	0.276	***	0.287	***	0.371	***	0.321	***
Educ. diff.	0.002	**	0.003	***	0.001		0.003	***	0.002	***	0.001	
Const.	0.004		0.105	***	0.415	***	-0.061	***	0.022	**	0.337	

Source: Authors' calculation using PNAD and PNADc.

Overall, the educational gap positively correlates with women's income rank position. In 1995, the first and the intermediate deciles were significant, indicating that women in couples formed by men with more education are in higher income ranks, all else staying the same. In 2019, this pattern

changed, and a positive and significant association was only found in the first half of the income distribution. That change can be linked to the changes in the educational assortative mating documented in the country (Hakak & Firpo, 2017; Ribeiro & Silva, 2009). The relationship between education and rank position is positively linear at almost every educational level, except for college-educated women. For this group, education has a growing impact on wages until the third decile, after which the effect starts to decline.

## **5 CONCLUDING REMARKS**

This paper investigates Brazil's changes between 1995 and 2019 in the spouses' earnings association and the resulting asymmetries in partners' wage-gap distribution. Its contributions to the existing research agenda on gender inequality among partners are twofold: first, by assessing changes in gender patterns in spouses' earnings associations, and second, by extending this analysis to different points along the income distribution. These are especially important in identifying the constraints in the path of gender inequality.

Over the last three decades, there has been a significant rise in cases of equal earnings among spouses. Furthermore, the mode of the relative wage gap got closer to this point of equality. Both movements represent progress toward income equality regarding partners' relative income. However, this change is still more related to reducing the wage gap in favor of men, with few changes observed in the frequency of women outearning their partners. It is expected in the following stages towards gender equality that not only will the gender wage gap decrease but also an increase in the arrangements that have women as the biggest household earner.

Changes are going toward equality, but with a limit; women are still supposed to earn less than their male partners. Bertrand et al. (2015) state that "women are bringing personal glass ceilings from home to the workplace". That can be understood in the context of the gender role beliefs about how people understand how "men" or "women" are supposed to behave, such as "a man should earn more than his wife" (Klesment & Van Bavel, 2017; Bertrand, 2015). This limiting behavior is only not identified among the men in the poorest decile of income, who earn less in the median than their wives. In that case, the need to obtain basic resources overlaps gender and societal norms that prevent a husband from earning less than his wife.

There appears to be an asymmetry in the partners' income association by gender. Men more frequently form couples with women in different income deciles, particularly when men are the primary earners. In contrast, women tend to marry closer to their income level. Couples at the upper and lower extremes of the income distribution present several differences in relative income behavior. On the mobility income through marriage, for example, the first decile is the only one where the immobility rate is bigger for women (63%) than men (55%), and the upward mobility through marriage is more frequent for the poorest man than for the poorest women in 2019. Overall, these results point to greater diversity in the pairing in the middle of the distribution, and, considering the extremes, the top is more uniform than the bottom.

The rank association curves show non-linear patterns in both years, 1995 and 2019, with minor changes over this period. When all couples are considered, including the single-earners, there is a positive and negative association in both years, the positive being more common among the highest-income spouses and the negative among the poorest. Also, the poorest, the other extreme of the income distribution, presents a more gender-neutral pattern of relative income. Considering only double-positive income couples, more pronounced associations are still present at the extremes of the distributions, but now they represent only positive associations of income.

In conclusion, our findings suggest that while relationships are moving towards greater equality in reducing the wage gap, a limit remains: women are still expected to earn less than their partners. The norm of the man as the household's primary breadwinner limits the equalizing change in the families, sometimes by shaping the labor offer of women. This pattern is one of the constitutes of the country's gender revolution, indicating that it also can be described as uneven and stalled, with intrinsic limits to gender equality. As a future development of this work, more characteristics of the partner's family should be considered, especially related to parenthood and fertility. They are believed to play a big role in shaping couples' division of employment and earnings. Another future development is the implementation of simulation exercises that compare a theoretical random pattern of income association with the existent one. That can be useful to isolate statistical and numerical limitations and determinations from the social and demographic patterns.

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## **STUDY 3 - GENDERED DYNAMICS OF OCCUPATIONAL TRANSITIONS: A STUDY OF THE BRAZILIAN LABOR MARKET**

### **ABSTRACT**

Gender occupational segregation is a persistent phenomenon observed worldwide, including in Brazil. In addition to disparities in occupational allocation, men and women experience distinct patterns of occupational transitions and employment trajectories over the life cycle, which are not gender-neutral, depending on the gender composition of their occupations. This study aims to analyze occupational transitions in Brazil from 2012 to 2019 and examine whether these transitions contribute to breaking down or reinforcing gender barriers. Our findings reveal a gendered pattern of occupational transitions within the Brazilian labor market. Women are more likely to transition to occupations that are non-typical of their gender, indicating their active role in overcoming gender divisions. However, over time, there has been a larger reduction in transitions outside of one's gender-dominant occupation for women compared to men. The initial employment type influences a worker's probability of staying in the same occupation, transitioning to a gender-typed or non-typed occupation, or leaving the workforce. When an occupational transition occurs, it is more likely to happen between occupations in the same gender type (for example, if a woman is in a female occupation, there is bigger probability to move to another female), especially for men, another segregation reinforcement that is stronger for men than women. Additionally, characteristics of the worker, such as age and education level, as well as characteristics of the initial occupation, such as informality and type of work schedule, play a role in gender (non)typed transitions. Occupational transitions indeed contribute to reducing gender occupational segregation, especially the ones performed by women. However, this pattern is unclear and does not appear to be intensifying over the years.

Keywords: Segregation, occupational gender composition, male-dominated occupation, occupational mobility, Brazil

### **1 INTRODUCTION**

Gender occupational segregation, including Brazil, is a persistent worldwide phenomenon (Silveira & Leão, 2020). The existence of systematic disparities in opportunities and rewards between men and women in different sectors of the labor market underscores the genuine problem of gender segregation and inequality (Hultin, 2003). Notably, occupations with a higher proportion of women tend to offer lower wages than those with a lower proportion of women, even after accounting for measurable differences in educational requirements and working conditions (England, 2010; Dill et al., 2006; Salardi, 2013).



In addition to disparities in occupational placement, men and women experience distinct patterns of occupational transitions. Differences in the influence of the life course play a significant role in shaping this asymmetry, as social and biological events that occur throughout life, such as marriage and parenthood, affect women's and men's labor market participation and occupational mobility differently (Dex & Bukodi, 2013; Crespo et al., 2014).

Understanding women's occupational dynamics requires considering the role of family structure. This is especially important since families have undergone substantial transformations since the mid-20th century, with an increasing occurrence of situations such as divorce, non-marital childbearing, and cohabitation (Tach, 2015). Despite the diversity in family arrangements, studies consistently demonstrate an unequal division of unpaid domestic work, also referred to as reproductive work (Zhou & Kan, 2019). This dual burden can profoundly impact mothers' work patterns throughout their family life course. While women have increased their overall labor force participation, they are still more likely than men to interrupt employment during periods of high family demands, often working part-time or engaging in less demanding occupations (Stier et al., 2018).

Occupational mobility, besides not being gender-neutral, also exhibits distinct patterns based on the gender composition of occupations. Research by Jacobs (1989) indicates higher mobility among occupations predominantly held by either women or men, leading to the concept of "revolving doors." Even when women get to access male-dominated occupations across their lives, a plurality of institutional and other types of social controls force them to leave those occupations. The same mechanisms attract men to predominantly male occupations over their professional life span. As a result, gender occupational segregation, characterized by the presence of typically male and female jobs, is reinforced by the greater tendency of workers in non-typical gender occupations to transition to other occupational types throughout their productive life course. This is consistent with a situation of long-term stability in the gendered division of the labor market.

To what extent can gender differences be explained by gender composition within occupations and employment trajectories of individuals predominantly in female, mixed, and male-typical occupations? Despite the existing literature on women's labor force participation in the Brazilian market, there remains a need for an approach that emphasizes the dynamic aspect of women's occupational integration within the context of their families. This study aims to analyze

occupational transitions in Brazil from 2012 to 2019 and examine whether these transitions contribute to breaking down or reinforcing gender barriers. To that end, occupations are classified as typically feminine, masculine, or integrated based on the proportion of men and women. This classification will enable an assessment of the capacity of occupational transitions to either reinforce or reduce gender occupational segregation.

The specific objectives of this study are as follows: i) identifying whether occupational transitions made by men and women throughout their life course contribute to alleviating or accentuating gender occupational segregation; ii) identifying patterns in occupational movements based on family structure, specifically considering household composition and the role of the worker in the family; iii) examining differences across the study period (2012-2019) and throughout individuals' life courses; iv) testing the independence between the origin and destination occupations (the "revolving doors" hypothesis or occupational trap).

The Continuous National Household Sample Survey (PNADc) from 2012 to 2019 captures occupational movements and characterizes occupations according to their gender intensity. Qualitative response models are employed to identify the gender compositional effects on the probability and type of occupational transitions and the influence of explanatory variables.

While this study builds upon the existing literature on gender occupational segregation and occupational transitions in Brazil, it brings a novel perspective by its dynamic nature. It addresses the issue of compositional gender effects, i.e., the impact of being in predominantly male or female occupations on the permanence of a worker in his profession, also incorporating family and life course aspects.

## **2 PURE AND COMPOSITIONAL GENDER EFFECTS – A REVIEW OF THE CONCEPTS AND THE BRAZILIAN BACKGROUND**

The persistence of gender segregation in the labor market can be attributed to various mechanisms. Some factors are related to individual characteristics, qualifications, and personal preferences (i.e., supply factors), while others pertain to gender-based differential treatment within the labor market (i.e., demand factors). Furthermore, self-selection plays a significant role in directing men and women toward specific occupations (Hultin, 2003).

Among the demand factors, theories of labor market segmentation suggest that the market is not operating freely, and certain institutional factors contribute to its division. For instance, labor legislation may create two distinct sectors within the market, where one sector offers better jobs with higher levels of security and salaries, while the other sector consists of lower-quality jobs. The gender segmentation of the market arises from the fact that women are a readily identifiable group, and employers associate this gender with lower levels of productivity, primarily influenced by demographic factors such as pregnancy or social factors like the double burden faced by working mothers. Consequently, women are more likely to be concentrated in the disadvantaged sector of the market (Debraff & Anker, 2004).

In the context of women's occupational trajectories within the labor market, a significant barrier has been identified, impeding their upward mobility. Referred to as the "glass ceiling," this invisible barrier limits women's advancement beyond a certain level on the occupational ladder (Maume, 1999). Furthermore, the structural barriers that impede upward mobility are stronger at the top of the occupational status hierarchy than at lower levels (Malin & Wise, 2018). The glass ceiling concept goes beyond a simple binary notion and is not solely focused on excluding women from top hierarchical positions. Instead, it encompasses a gradual hindrance to overall upward occupational mobility, affecting women's advancement in leadership roles as well as other career opportunities.

In addition to the pure gender effect, various theoretical developments have examined the impact of gender occupational composition. For instance, Kanter (1977) developed a theory for understanding the negative treatment of underrepresented women in predominantly male occupations. This theory suggests that being a minority individual in a profession entails disadvantages due to heightened visibility, prejudice, and, in specific cases, gender segregation processes. Empirical studies consistently highlight that this phenomenon disproportionately affects women (Malin & Wise, 2018; Dill et al., 2006). As a result, "token" women, referring to minority women in typically male-dominated professions, face situations where they are excluded from accessing crucial resources for professional success, particularly those of a relational nature, such as informal networks. This exclusion gets in the way of their career advancement and prospects for promotion in these fields.

Horizontal gender segregation in the labor market contributes significantly to the disadvantages faced by women, such as the gender wage gap. Moreover, gender-typical individuals are more likely to remain in those roles, resulting in an increased likelihood of occupying leadership positions and further perpetuating vertical gender segregation (Malin & Wise, 2018).

"In sum, women as a group risk facing both of the flip sides of sex segregation. First, women in female-dominated occupations may be subject to poor career and reward opportunities connected to such fields of work. Second, women who work in male-dominated occupations may suffer professionally by being excluded from lucrative social networks and other resources needed for job success." (Hultin, 2003, p. 38)

Kanter's initial development (1977) examined cases of men and women who constituted a minority in their respective occupations. However, subsequent empirical studies have revealed that, in the case of men, there can be positive outcomes associated with being a token (Hultin, 2003). Williams (1992) highlights that some companies have adopted a strategy of promoting men in predominantly female careers to enhance workplace morale and foster better relationships with consumers, a phenomenon known as the "glass escalator".

The highlight given to men who are minorities in their occupational groups confers their advantages, especially in a relational nature, whether with coworkers, clients, or even supervisors. Despite feminized occupations being associated with lower wages and lower prestige, men have incentives to enter these fields. In occupations predominantly populated by women, men receive higher salaries and are more likely to be promoted than their female counterparts (Dill et al., 2006). Consequently, men working in occupations such as nursing, elementary school teaching, and social work "are able to ride a 'glass escalator' up internal career ladders to an extent and at a speed that their female coworkers can hardly enjoy" (Hultin, 2003, p. 31).

There is also a compositional effect of gender on occupational mobility. Analyzing empirical data from the United States and observing greater mobility in predominantly female or male occupations, Jacobs (1989) proposed the concept of "revolving doors" to explain the apparent contradiction in the direct relationship between segregation and mobility. Although occupational gender segregation remains high overall, women often transition between typically male, female, and neutral occupations throughout their lives due to various institutional factors and informal forms of social control. Similar mechanisms also apply to men, leading them to return to predominantly male occupations, contributing to the long-term stability of gender division in the labor market (Jacobs, 1989).

The concept of revolving doors encompasses a life course approach, particularly when contrasted with the theory of cumulative disadvantages, which views the penalties associated with female occupations, such as lower training intensity, as lasting and cumulative. According to this theory, the longer one works in a female-dominated occupation, the more challenging it becomes to transition to other fields, creating a "trap" situation. On the other hand, the concept of revolving doors considers that transition probabilities are conditionally independent of past history. In this case, women in occupations that are not traditionally female face adverse social forces that push them back into female-dominated occupations, and those already in female occupations tend to remain there. As a result, the disadvantages associated with female occupations are not cumulative, unlike other social disadvantages, and women working in female occupations do not find themselves trapped (Chan, 1999).

In addition to the barriers to acceptance and integration that women face upon entering male-dominated occupations, such as tokenism (Kanter, 1977), the increasing time demands of high-status occupations lead women to leave male-dominated jobs. More extended workdays potentially make it more challenging for workers to find a balance between their personal and professional lives (Cha, 2013). This phenomenon is gender-neutral but contrasts with the conditions that allow workers to meet this standard: women still have more outstanding family obligations, resulting in a scarcity of time, which is a resource in high demand in certain predominantly male occupations (Fritsch et al., 2020). Predominant male occupations often require long working hours and continuity, making it more difficult to reconcile with household and family care responsibilities. On the other hand, typically female occupations generally offer more flexible work arrangements that allow for greater work-life balance (Trappe & Rosenfeld, 2004).

Aspects of the life cycle also influence family composition and relate to occupational transitions characterized by gender intensity. Social forces burden women who are mothers with non-work-related obligations, leading them to choose female occupations actively (Williams, 1992) or to be chosen only for those occupations.

Literature on occupational transitions in Brazil is extensive, covering various aspects and perspectives. One approach connects labor market transitions to movements on the social scale, as explored by Pastore and Valle Silva (2000). In a related but theoretically distinct approach is the literature on the wage impact of occupational transitions, such as the works of Monsueto, Bichara,

and Cunha (2014), Rodrigues, Vieira, and Freguglia (2016), and Perenza and Schneider (2009). Another important line of research investigates segregation in the labor market and transitions between formal and informal employment. Notable studies in this area include Hirata and Machado (2010), Barbosa Filho and Moura (2015), and Corseuil and Foguel (2012). The relationship between occupational mobility and individuals' educational mismatch is examined by Machado and Oliveira (2013). Additionally, some studies explore the occupational mobility of black individuals compared to the rest of Brazilian society, such as Costa (2009). Finally, there are works with a more specific focus on gender, such as Oliveira and Machado (2000) and Guimarães (2001).

Oliveira and Machado (2000) analyze mobility in relation to occupational status in metropolitan Brazil in the 1990s, revealing that the labor market not only unevenly absorbs men and women but also presents higher probabilities of upward occupational mobility among men. Guimarães (2001) describes the differences in mobility trajectories between men and women in the formal market, considering factors such as "sector mixity," which refers to the proportion of women in a particular productive sector. The study examines the fate of workers laid off from the industrial sector and finds that women are more likely than men not to establish a new formal employment relationship. Moreover, in male-dominated sectors, gender continues to operate as a discriminator in reentry, with women who were laid off facing stronger barriers in returning to the sector.

In addition to studies on occupational mobility, it is important to highlight the national literature that addresses the gender composition of occupations, such as Madalozzo's (2010) and Salardi (2014) works. Madalozzo (2010) describes the gender composition of occupations and observes that while women increasingly enter traditionally male-dominated occupations, traditionally female-dominated occupations have maintained their composition over the past three decades. Examples of traditionally male-dominated occupations include carpenters, mechanics, and drivers, while teachers, nurses, and librarians are traditionally female-dominated. On the other hand, occupations such as engineers, insurance agents, police officers, detectives, and administrators, which were traditionally male-dominated, are experiencing an increasing presence of women. However, men still face resistance or difficulties when entering occupations considered feminine, particularly those related to caregiving. Salardi (2014), also examining the femininity intensity of occupations in Brazil, finds that being employed in female-dominated occupations reduces

women's wages, especially in higher-paying jobs, while positively impacting men's wages, albeit primarily in low-paying jobs. This pattern has remained stable over time.

### **3 DATA, VARIABLES, AND METHODS**

#### **3.1 Database and variables**

The database employed is the Continuous National Household Sample Survey (PNADc), available through the Brazilian Institute of Geography and Statistics (IBGE) since 2012 for the national territory. Data from 2012 to 2019 will be used to avoid biases caused by including the period affected by the social distancing measures and other consequences of the 2019 COVID pandemic, which significantly impacted the labor market.

The PNADc survey follows a rotating panel design, where a household is surveyed for one month, remains out of the sample for the next two months, and returns for the following interview. This process is repeated five times, resulting in a 1-year and 4-month gap between the first and last interviews conducted in a household. In that way, one-fifth of the households complete the interview cycle every time and get replaced by a new sample of households that start their own one-year and four-month cycle. This characteristic allows for the observation of occupational transitions of individuals. In this study, the observed transition is between the first and second interviews that a subject answered, representing a three-month interval. The analysis will focus on occupational transitions among Brazilians aged 25 to 64 who were employed in the first interview.

The PNADc provides an identifier for the household but has yet to make the individual longitudinal identifier available. Therefore, individuals are identified based on their household, sex, and date of birth. However, to improve the process and ensure minimal sample loss, a matching algorithm will be applied to identify individuals in the sample, based on the one developed by de Ribas and Soares (2008) for PME data (IBGE).

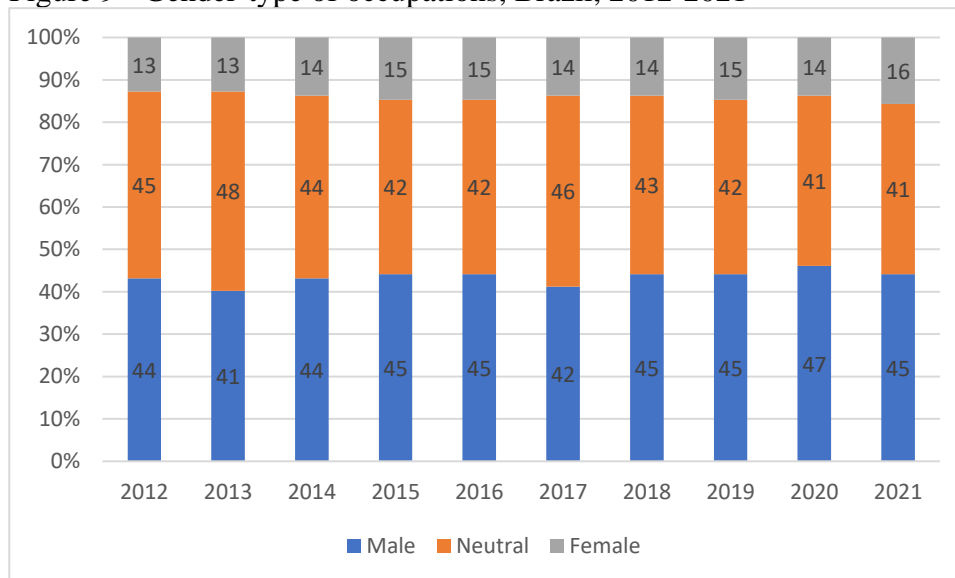
#### *Dependent variable*

The dependent variable represents the occupational transitions that male and female employees make. The identification of an individual's occupation is based on the Brazilian Classification of

Occupation (CBO) using the 3-digit classification.<sup>10</sup> To identify occupational movements, a comparison is made between the first CBO code an individual informed and the one that was reported in the following interview three months later. Unemployment or exit of the labor force, also possible states to be found in the second interview, were treated as undistinguished.

Based on the identification of the worker's CBO, occupations are classified as typically female, typically male, and gender-neutral according to the gender composition of the professionals. The gender classification cutoff points are as follows: if up to 30% of workers in an occupation are women, it is considered typically male; if more than 70% are women, it is considered typically female; and if the proportion of women in the occupation ranges from 30% to 70%, it is considered integrated, or neutral. This classification aligns with previous studies such as Jacobs (1989), Fritsch et al. (2020), and others.

Figure 9 - Gender-type of occupations, Brazil, 2012-2021



Source: Authors' calculation based on PNADc 2012-2021.

Figure 1 shows the classification of Brazilian occupations in the period. There are more male occupations than female occupations in all years of the studied period (almost three times). This represents a greater concentration of women in fewer occupations than men.

<sup>10</sup> Consistency tests were conducted to verify the impact of this choice on the results. In the case of less than 30 observations, the occupations were grouped following the 2-digit classification to maintain statistical significance.



Table 1 shows the distribution of all the Brazilian employees, women and men, into male, neutral, or female occupations. Again, the pattern has been relatively stable over the years, with the big exception being the pandemic times, which will not integrate the analysis. There was a decrease in the share of women in male occupations in the period, from 16.2% in 2012 to 12.7% in 2019, compensated mainly by a rise in the participation in female-type occupations. Furthermore, women are mainly in female occupations, but with a slight difference for the neutral occupations; 49% of women were in female occupations in 2019 and 39.9% in the integrated ones, leaving 13.9 for the male occupations. Men, on the other hand, occupy more intensely the male occupation (68.2% in 2012 and 64.6% in 2019) and are even less employed in cross-typed occupations (5.8% in 2012 and 8.2% in 2019).

Table 15 - Distribution of workers according to the gender type of the occupations by gender, Brazil, 2012 to 2021 (%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>General</b>										
Male	47.0	45.9	46.4	45.8	45.1	43.0	43.1	42.9	44.3	44.6
Neutral	31.5	32.4	32.0	30.2	30.9	33.8	33.3	31.8	32.0	29.9
Female	21.6	21.7	21.7	24.0	24.0	23.2	23.6	25.3	23.8	25.5
<b>Women</b>										
Male	16.2	14.8	15.4	14.5	14.3	12.9	12.9	12.7	13.9	14.0
Neutral	39.3	40.5	40.1	37.3	37.8	41.4	40.9	38.3	39.9	37.0
Female	44.5	44.7	44.5	48.2	47.9	45.8	46.2	49.0	46.2	49.0
<b>Men</b>										
Male	68.2	67.3	67.6	67.4	66.5	64.4	64.8	64.6	66.1	66.4
Neutral	26.0	26.9	26.3	25.3	26.1	28.5	27.8	27.2	26.2	24.9
Female	5.8	5.8	6.0	7.2	7.4	7.1	7.3	8.2	7.6	8.7

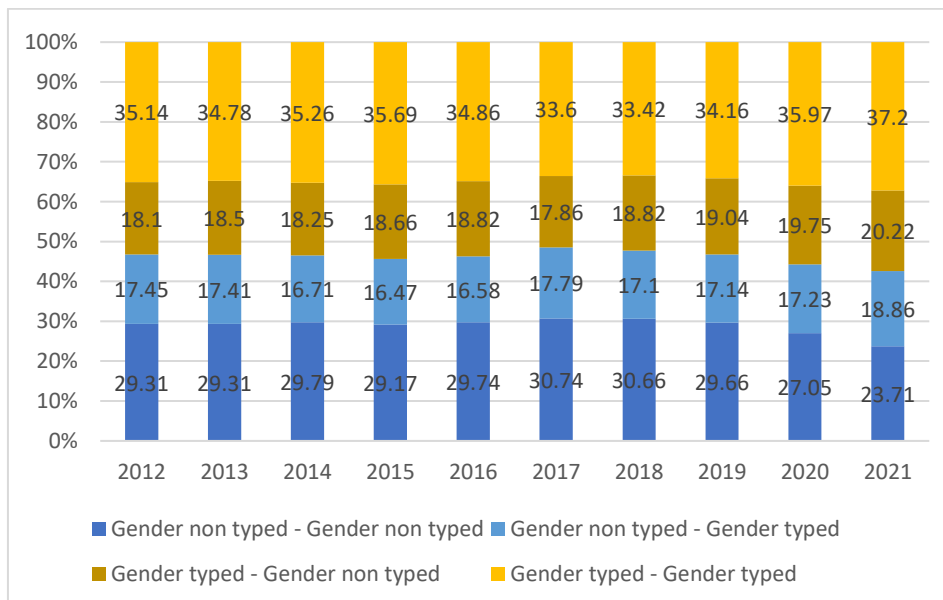
Source: Authors' calculation based on PNADc 2012-2021.

Based on this classification and the individual's gender, it is possible to implement a gender-typed and gender non typed classification. A woman employed in a female-dominated occupation is classified as being in a gender-typed occupation. In contrast, a woman in a neutral or male-dominated occupation is classified as being in a gender non-typed occupation<sup>11</sup>. The same logic is applied to the male classification.

<sup>11</sup> Movements to integrated occupations are considered typical gender transitions, as the objective is to analyze atypical gender transitions. A similar strategy is employed by Trappe & Rosenfeld (2004) and Fritsch et al. (2020).

Figure 2 illustrates the sample composition considering the first and second observations over time. The darker colors represent changes from one category to another, while the lighter colors represent the proportion of people who remained in the same category. The more frequent transitions are the ones with origin and destination in gender-typed occupations, and the less frequent one is the change from a gender-non-typed occupation to a gender-typed one. This distribution of transitions stayed stable in the period analyzed. Also stable was the share of the occupational changes that women and men made that were gendered typed, an average of 35.6% of the women transitions, while for men, this figure was bigger, 57.1%.

Figure 10 – Distribution of occupational transitions by gender type on origin and destination, Brazil, 2012-2021



Source: Authors' calculation based on PNADc 2012-2021.

### *Independent variables*

Some individual variables, like gender, are important to understanding the pattern of transitions based on occupational intensity, which is indispensable to building the occupational classification. Other characteristics of the workers are also important, such as age, used as a discrete variable in which the ages were categorized in five-year intervals (25 to 29, 30 to 34, etc.)<sup>12</sup>, and education,

<sup>12</sup> That classification already accounts for nonlinearity without the need for the quadratic term.

also constructed categorically to capture the highest level completed, can be *Complete Elementary Education 1* (up to 7 years of study), *Complete Elementary Education 2* (8 to 10 years of study), *Complete High School* (11 to 14 years of study), or *Complete Higher Education* (15 or more years of study).

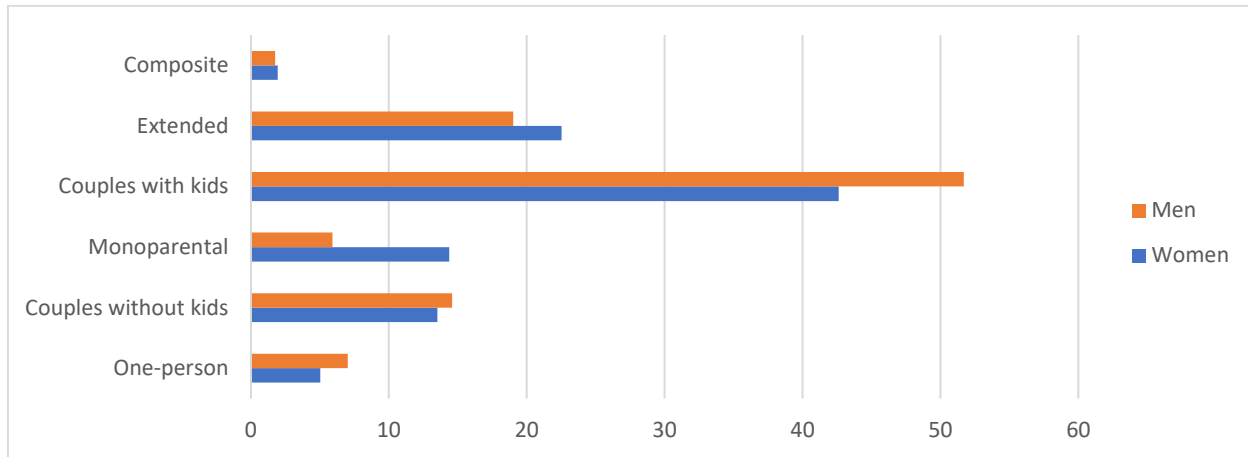
Family or household variables are also included, such as status in the household, and a categorical variable consisting of *Responsible*, if the person is the household reference or his/her spouse, *Son* if the person is a son, daughter, or stepchild of the reference person, and *Others*, which includes all other cases, such as mother of the responsible, brother, cousin, etc. This nondifferentiation of the person who answered to be the reference or head of the household to their spouse regards a methodological aspect of the database, in which, more often, the person answering the questionnaire is to declare him or herself as the reference but also as a theoretical one.

We also include a variable representing the household type in which the individual resides. Households were classified by identifying kinship relationships between the survey respondent and other individuals who share the same household. In that sense, a household can be: i. one-person; ii. formed by a couple without children; iii. single parent; iv. couple with children; v. extended families, where in addition to the nucleus, there are other relatives, such as grandchildren, parents, etc.; and vi. composite, with contain at least one individual that is not related to any other in the household<sup>13</sup>. It is especially important to indicate homes that have kids as some studies are pointing at the effect of the presence of children is to reduce women's probability of labor force participation and to increase the chances of part-time work and self-employment (Guiginski & Wajnman, 2019; Bachmann et al., 2019). Figure 3 shows the sample composition regarding household types for men and women.

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<sup>13</sup> Types of union (civil marriage or cohabitation) are considered indistinctly.

Figure 11 – Distribution of workers by household type and gender, Brazil, 2012-2019



Source: Authors' calculation based on PNADc 2012-2019.

Categorical variables related to the initial occupation will also be used, including public sector employment, informal employment, self-employment, and a variable indicating whether the work hours are greater or less than 35 hours per week. All other information from the individual and household are also referent to the first interview, i.e., are relative to a pre-transition time.

### 3.2 Empiric strategy

Multinomial logistic regression models examine individual, occupational, and household characteristics' role on the workers' occupational transitions. These dynamic states are investigated regarding their influencers, fixed in the first period observed, and the destination occupation gender typicality. Models for female and male workers are separately estimated.

The dependent variable can assume four outcomes: i) immobility, when a worker remains in the same occupation; ii) gender typed occupational transition, if a change to a different occupation occurs and this new occupation is typical of the worker; iii) gender non-typed occupational transition, if a change to a different occupation occurs and this new occupation is not typical of the worker, and iv) out of work, on cases of unemployment or exit of the labor market.

Since one of the main goals of this work is to verify if the occupational transitions are breaking or enforcing gender segregation, it is important to verify the impact of the gender intensity of the occupation of origin in the destination probabilities. So, a dummy variable for the gender type of the original occupation is used as an independent variable. It assumes value one if the original

occupation is gender typed for that individual and zero if not. Individuals' characteristics, age and education are also included as dummies. For the family characterization, a mixed classification of the person's household type and her role as responsible or co-responsible for the household is used. Constructing this interaction variable is important to avoid problems from the presence of multicollinearity and to emphasize the intersectionality of these dimensions. Also, dummy variables for characteristics of the first employment are added. Finally, period dummies are included to account for the time trend.

## 4 RESULTS AND DISCUSSION

### 4.1 Preliminary considerations

When discussing occupational transitions, it is essential to remember that it is considered a selected portion of the population, specifically those already employed. This selection is not random, and the characteristics and processes that lead individuals to enter the job market and secure employment can intersect or interact with those factors associated with transitions. Gender is widely recognized as a significant determinant of employment likelihood. In our sample, approximately 54.5% of women between the ages of 24 and 64 are employed, while the corresponding figure for men is 80.2%. This disparity can primarily be attributed to a substantially higher inactivity rate among women. This trend remained consistent over time, with the most notable change from 2012 to 2019 being the increasing unemployment rate for both genders.

Table 16 – Distribution of status in the workforce on first and second observations by gender, Brazil, 2012-2019 (%)

		Women				Men			
		Second Obs				Second Obs			
First Obs		Employed	Unemp.	Inactive	Total	Employed	Unemp.	Inactive	Total
	Employed	88.1	2.7	9.2	100	92.9	3.0	4.1	100
	Unemp.	28.5	39.7	31.8	100	45.2	38.5	16.3	100
Inactive	16.1	6.2	77.8	100	28.4	9.9	61.6	100	

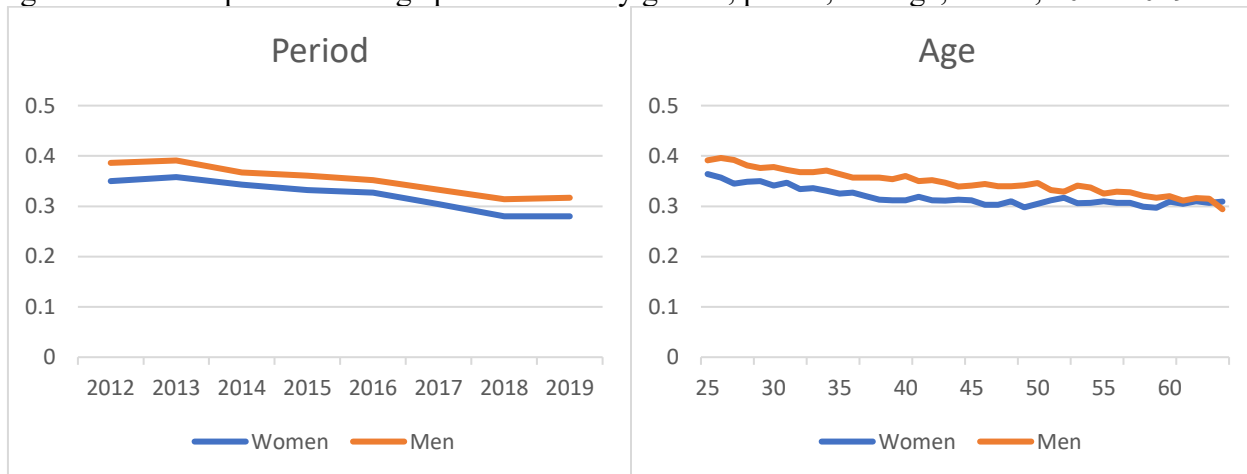
Source: Authors' calculation based on PNADc 2012-2019.

In addition to having higher employment rates than women, men also exhibit greater employment stability, with 93% of men remaining employed in the next three months compared to 88% of women (Table 2). Among those who are unemployed, 45% of men were able to secure employment

in the subsequent observation, while only 28% of women managed to find a job during that period. On the other hand, the discouragement phenomenon appears to be more prevalent among women, as 32% transitioned from unemployment to inactivity, double the percentage observed among men (16%).

The sample of individuals employed in both the initial and subsequent observations consisted of a mix of individuals who remained in the same occupation and those who transitioned to different ones. Figure 4 depicts the proportion of individuals who reported different occupations while employed during both time points. Throughout the analyzed period, there was a decline in the proportion of individuals who changed occupations, observed for both men and women. Moreover, age emerged as a significant factor influencing occupational transitions, independent of gender, since younger individuals had a higher likelihood of experiencing occupational changes within the studied age range. Additionally, the transition curves for men consistently surpassed those for women, suggesting that men were more likely to undergo occupational transitions than their female counterparts.

Figure 12 – Occupational change probabilities by gender, period, and age, Brazil, 2012-2019



Source: Authors' calculation based on PNADc 2012-2019.

It is important to notice that the Brazilian labor market presents a mobility rate significantly higher than what was found for other countries, like Bachmann et al. (2020) that shows that although the extent of occupational mobility differs strongly by country, on average, 3% of European workers change their occupation per year.

## 4.2 Gender typed and non-typed occupational transitions

The results of the statistical model applied to analyze the factors influencing mobility between segregated and non-segregated occupations are presented in this section<sup>14</sup>. Firstly, the coefficient of the original occupation type is significant, implying that the occupation type of the origin and the destination are not independent, contradicting the predictions of the revolving doors theory (Jacobs, 1989).

According to the results found for the impact of the initial occupation type on the employment state on the second observation, for both women and men, being in a gender-typed occupation increases the likelihood of staying in the same occupation compared to being in a more integrated occupation or non-typical one. This result points to a perpetuation of the segregation that can be attributed to the “scarring” effect of the experience of a woman in a male-dominated occupation, increasing their likelihood of leaving, or the “stopgappers” effect, observed when men enter female-dominated occupations but quickly leave (Torre, 2014, 2018).

The biggest impact that is belonging to a gender typed occupation is on decreasing the chances of realizing a gendered non-typed transition, both for men and women. For instance, for women, being in a female occupation instead of an integrated or male one decreases the chance of moving to a male or integrated occupation more than transitioning to another typically female, and the same reasoning applies to male workers, with an even slightly bigger (negative) effect. This movement is related to the labor market segmentation since it represents possible change from being part of the gender majority in an occupation to being the minority or belonging to a more integrated occupation. That said, women's occupational movements contribute more to integrating the labor market or at least reinforce segregation.

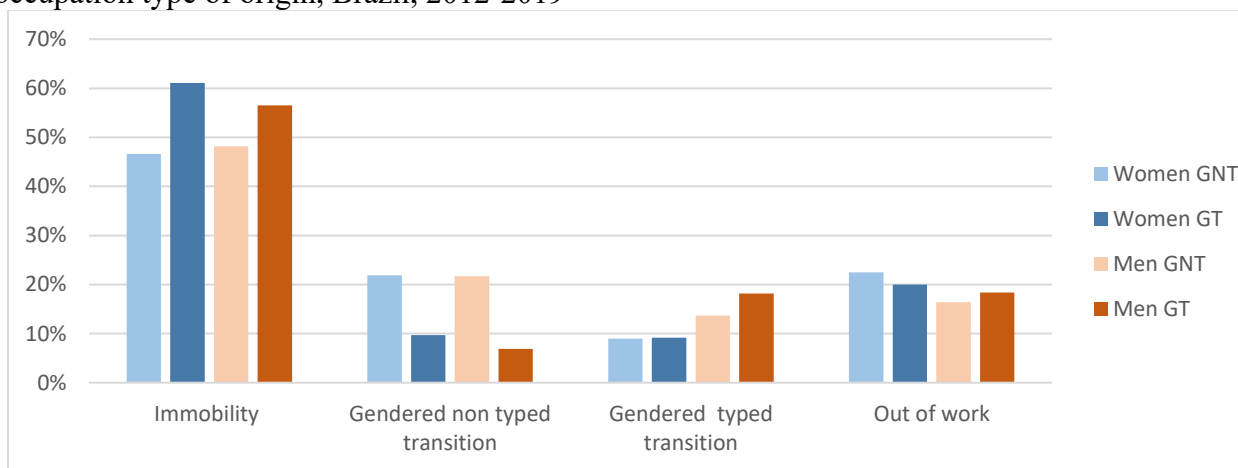
Specifically, in the case of women, the effect of being in a gender-typed occupation on the likelihood of moving to another female occupation or being out of work is quite similar. Similarly, for men, the second biggest impact of being in a male occupation is decreasing the likelihood of being unemployed, and the effect on gender-typed transitions is the smaller one. The biggest difference in the results found in the female and male estimation, for the variable representing the initial employment, is in the impact on gender typed transitions, which is bigger for women, i.e.,

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<sup>14</sup> The complete results from the model estimated are presented in the Appendix.

being in a female occupation decreases the chance of moving into another female occupation for women more than the same dynamic has on a man.

Figure 13 - Predicted probability of the employment state in the second observation by gender and occupation type of origin, Brazil, 2012-2019



Source: Authors' calculation based on PNADc 2012-2019.

Note: GNT means gender non-typed occupation, and GT means gendered typed occupation.

Figure 5 presents the predicted probability of remaining in the same occupation, making one of the two kinds of occupational transition or being out of a job in the second observation, for each gender and by the type of occupation in the first one. This graphical representation confirms that for both men and women, being in a gender-typed occupation contributes to occupational stability, which can be interpreted as the "holding power" of gender-typed occupations (Trappe & Rosenfeld, 2004). Furthermore, when a transition does occur, it is more likely to be between occupations that fall within the same category: for workers in a typed occupation, the probability to move for another typed is bigger than crossing the gender barriers, and workers that are already in gender atypical occupation tend to continue having this characteristic when a transition occurs. However, this pattern is more evident for men, and the likelihood of women going into a typically female occupation does not change expressively regarding the type of the original occupation. Also, women in female-dominated occupations present a similar probability of transitioning to a gender-typed or non-typed occupation. Finally, the impact of being in a gender-typical occupation on decreasing the likelihood of leaving the labor force without entering another employment opportunity in the next three months is more significant for women.



Two main results point to an overall perpetuation of segregation: higher immobility in gender typed occupations and the tendency to stay in the same type of occupation when there is an occupational change, especially among men. This tendency is, at least in part, outweighed by a higher probability of women moving to a more integrated or male occupation, even when she is coming from a majority female one. It is important to note that this segregation mechanism can also affect vertical gender segregation, as workers typical of an occupation are more likely to stay in those occupations and consequently have a higher chance of reaching leadership positions (Malin & Wise, 2018).

To better understand the dynamics of gender-typed and non-typed occupational transitions, certain individuals and employment characteristics from the first observation were included as control variables in our analysis. Age significantly influences the likelihood of individuals being out of the labor market. As expected, individuals at the extremes of the age distribution were more likely to be out of the labor market than those in the middle age groups. For men, the probability of making gender-typed transitions decreases with age, while age does not seem to significantly impact the probability of gender non-typed transitions. For women, the likelihood of making gender non-typed transitions decreases until a specific age range (45 to 49 years old) reaches an inflection point that is only observed in the following age category, after which the probability decreases again. This pattern is consistent with occupational changes that may occur due to women's retirement, where they leave their primary job and seek other activities as a complementary form of income. The theory of cumulative disadvantages (Jacobs, 1989; Chen, 1999) adopts a life course approach by emphasizing the lasting and cumulative penalties associated with female occupations. In line with this case, our results support this theory since they identified a decreasing rate of change into non-female occupations with time and no relationship between age and non-male occupations.

Education levels substantially impact transitions to gender non-typed occupations for both men and women. Higher education levels increase the likelihood of transitioning to gender non-typed occupations compared to staying in the same occupation. This aligns with England (2005) and Fritsch (2020) findings, who also observed increased gender integration resulting from occupational movements among workers with a college degree. Furthermore, among men, education exhibits a growing negative impact on the probability of making gender-typed transitions. Among women, this impact is positive until the college level. The effect of schooling

on exiting the workforce is also essential, particularly for women: the higher the educational level, the smaller the chances of leaving the job without pursuing another career in the following months.

Informality and self-employment have distinct effects on men and women. For women, working in the informal sector or being self-employed increases the likelihood of transitioning between occupations, particularly towards gender-typed occupations in the case of informality and gender non-typed occupations in the case of self-employment. It also decreases the likelihood of being unemployed at the subsequent interview. On the other hand, informality and self-employment increase the chances of immobility for men compared to other options, with the most significant negative impact observed in gender-typed transitions in the former and gender non-typed transitions in the latter. These findings suggest that being an informal or self-employed worker is more of a temporary state for women, whereas it tends to be a more permanent situation for men.

The impact of full-time employment, defined as working 35 or more hours per week, differs for men and women in terms of their occupational behavior. For women, full-time employment reduces the likelihood of transitioning to gender-typed occupations and increases the likelihood of transitioning to gender non-typed occupations. However, for men, besides having a bigger effect on the probabilities of transition than for women, full-time employment decreased the likelihood of all types of transitions, with a stronger effect observed in gender-typed transitions. In other words, what could be perceived by men as an insufficient number of hours of work increases their chances of undergoing occupational changes of any kind, while for women, it decreases their chances of transitioning to non-female occupations.

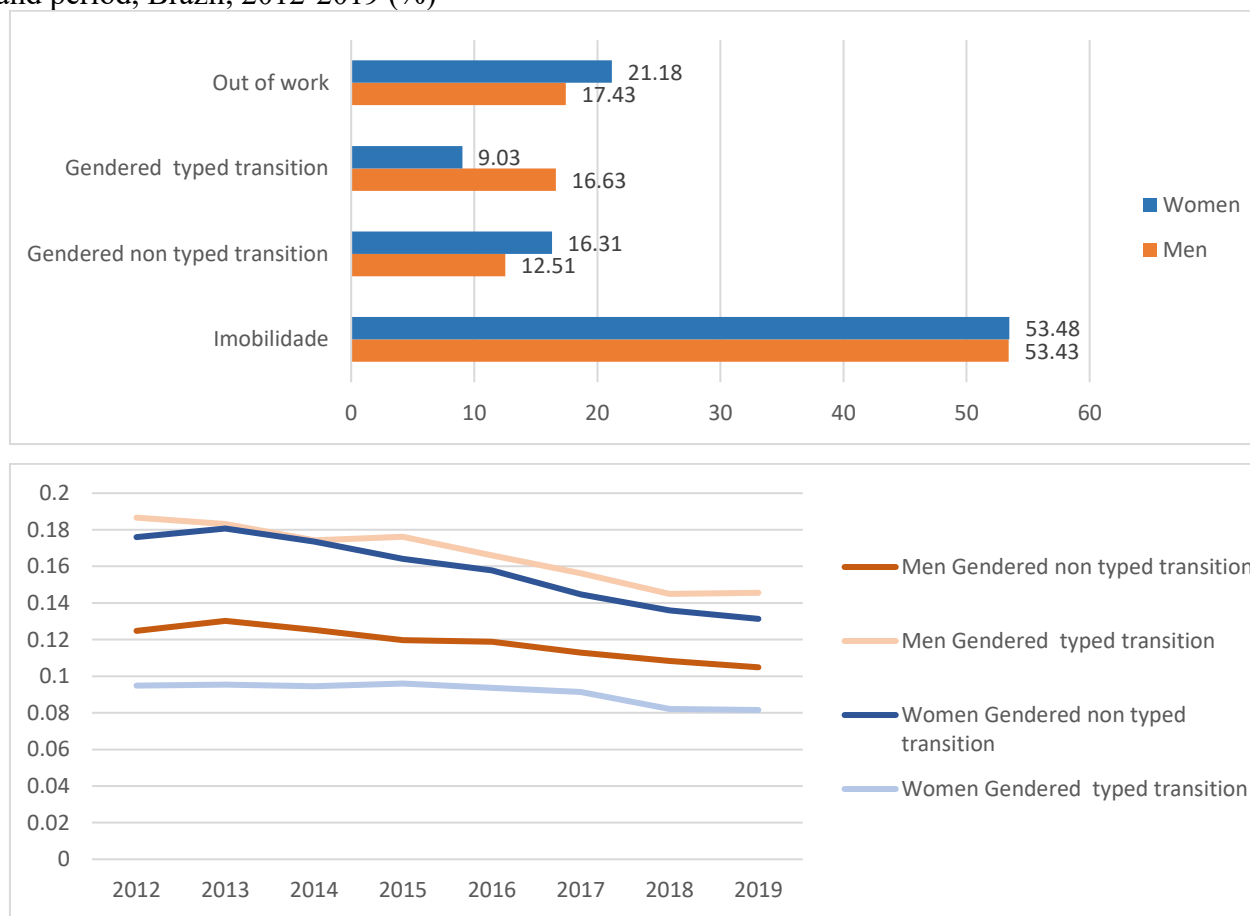
Lastly, working in the public sector, which in Brazil often entails high levels of job security and stability, was associated with a greater probability of immobility across all cases, except for women's gender-typed transitions, which happens more often for women working in the public sector than in the private one.

To conclude, we analyze the predicted probabilities for men and women of the four possible states: immobility, gendered typed and non-typed transition, and exit of the labor market controlling for all the previously described characteristics, regardless of the original employment type. These results are presented in Figure 6, which shows the probability of the four possible states disaggregated by gender and the two types of transition over time. Immobility rates are pretty similar between genders. However, men tend to make more gender typed transitions, while women

tend to make more gender non-typed transitions. In that sense, a man has more probability of transitioning to a male occupation than a woman to a female one. This indicates that institutional factors and informal social control mechanisms are acting more on men to reinforce the stability of gender division in the labor market by directing them towards predominantly male occupations.

Furthermore, women exhibit higher rates of transitioning to unemployment or leaving the workforce than men, which is consistent with the pattern found in the general population; the pattern remained consistent across the years examined in our study. This finding aligns with Guimarães (2001), who specifically investigated Brazilian workers in the industrial and male-dominated sectors and found that women are more likely than men to struggle to find a new job post-transition.

Figure 14 - Predicted probability of status on the workforce in the second observation by gender and period, Brazil, 2012-2019 (%)



Source: Authors' calculation based on PNADc 2012-2019.

Figure 6B shows the scenario presented in 6A, showing the gendered typed and gendered non-typed transitions of women and men and how they evolve over time. There is a decrease in the probability of a woman making a gender non-typed transition, which could indicate a more conservative movement of maintenance of the gender segregation of the occupations if it was not for the smaller probability of gender-typed transitions as well. The same phenomenon is observed in the probabilities of transition for men. Increasing levels of immobility are the counterpart of this movement.

In comparison to the gender typed movements of women, the non-typed ones decreased more rapidly, although the difference is not substantial<sup>15</sup>. This could be interpreted as a backlash movement, representing a conservative reaction to the progressive diffusion of ideals and effective change (Fritsch et al., 2020; England & Li, 2008). Even if that difference is too small to be considered representative of such a movement, there is also no data to support the opposite hypothesis that the transitions made by women are contributing to a more integrated labor market. For men, we observe a slightly different scenario, with a growing tendency of gender non-typed transitions, although the change is also not significant<sup>16</sup>.

During the analyzed period, it was more common for women to transition into traditionally male occupations than for men to transition into traditionally female occupations, so the female movements contributed more to the integration of occupations. However, when we examine the temporal pattern, we can observe a more noticeable reduction in this type of transition for women compared to men. This stabilization of the integration movement has also been identified by Fritsch et al. (2020) in Austria in recent years and by England and Li (2008) in the context of higher education fields.

This diminishing tendency of women to move into typical male jobs can be linked to the reactivation of social controls. Segregation is not solely based on gender socialization and educational attainment; it is a persistent process that continues to operate through structures and pressures even after women and men have entered the labor market (Jacobs, 1989; Torre & Jacobs,

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<sup>15</sup> Considering all occupational changes, the maximum share of gender non-typed transitions for women during the period was 65.7% in 2013, while the minimum was 62.9% in 2017.

<sup>16</sup> Considering all occupational changes, the highest share of gender non-typed transitions for men was observed in 2018 at 59.9%, while the lowest occurred in 2015 at 56.8%.

2021). These structural and workplace elements have solidified in the last years for women, coinciding with a rise in political and behavioral conservatism in the country (ref).

These patterns dialog with the ones presented in Table 1, which reflects declining levels of gender segregation in occupations held by men, but not in the women's case, since they held less male typical positions in the period. For women, there seems to be less encouragement or opportunity to pursue careers in male-dominated fields, increasing the pressure to exit such fields. Conversely, the opposite is observed for men, and it is possible that the same factors that contribute to their increased participation in female occupations also facilitate their gender non-typed transitions. In other words, women workers are less integrated into male-dominated occupations, while male workers occupy and transition more into traditionally female occupations. In that case, *“despite the low wages and low prestige of feminized occupations, men have incentives to enter these occupations since, in occupations predominantly filled by women, men not only have higher salaries but are also more likely to be promoted compared to their female counterparts”* (Dill et al., 2006). These for Brazil align with previous research conducted in other labor markets (Jacobs, 1999; Chan, 1999; Hultin, 2003), emphasizing the persistence of gender segregation, even in dynamic occupational transitions.

#### 4.3 Household characteristics and gender typed transition

The gendered dynamics of occupational transitions are also investigated within different household contexts. The complete set of coefficients is presented in the Appendix. Among women, those living in composite households and being the (co)reference have the highest probabilities of transitioning to male or neutral occupations. Women living with their parents or in extended households also show higher probabilities of transitioning to non-gendered occupations. Married women who are co-responsible for the household have smaller but still positive probabilities of occupational transitions compared to women in unipersonal households.

Regarding transitions to female occupations, married women residing in households without sons or daughters have the lowest probabilities. In contrast, women in extended or single-parent households exhibit higher probabilities, statistically different from those in unipersonal households. These findings indicate that household composition, specifically the presence of

dependents and the ability to share responsibilities with others, contribute to shaping women's likelihood of transitioning to different types of occupations.

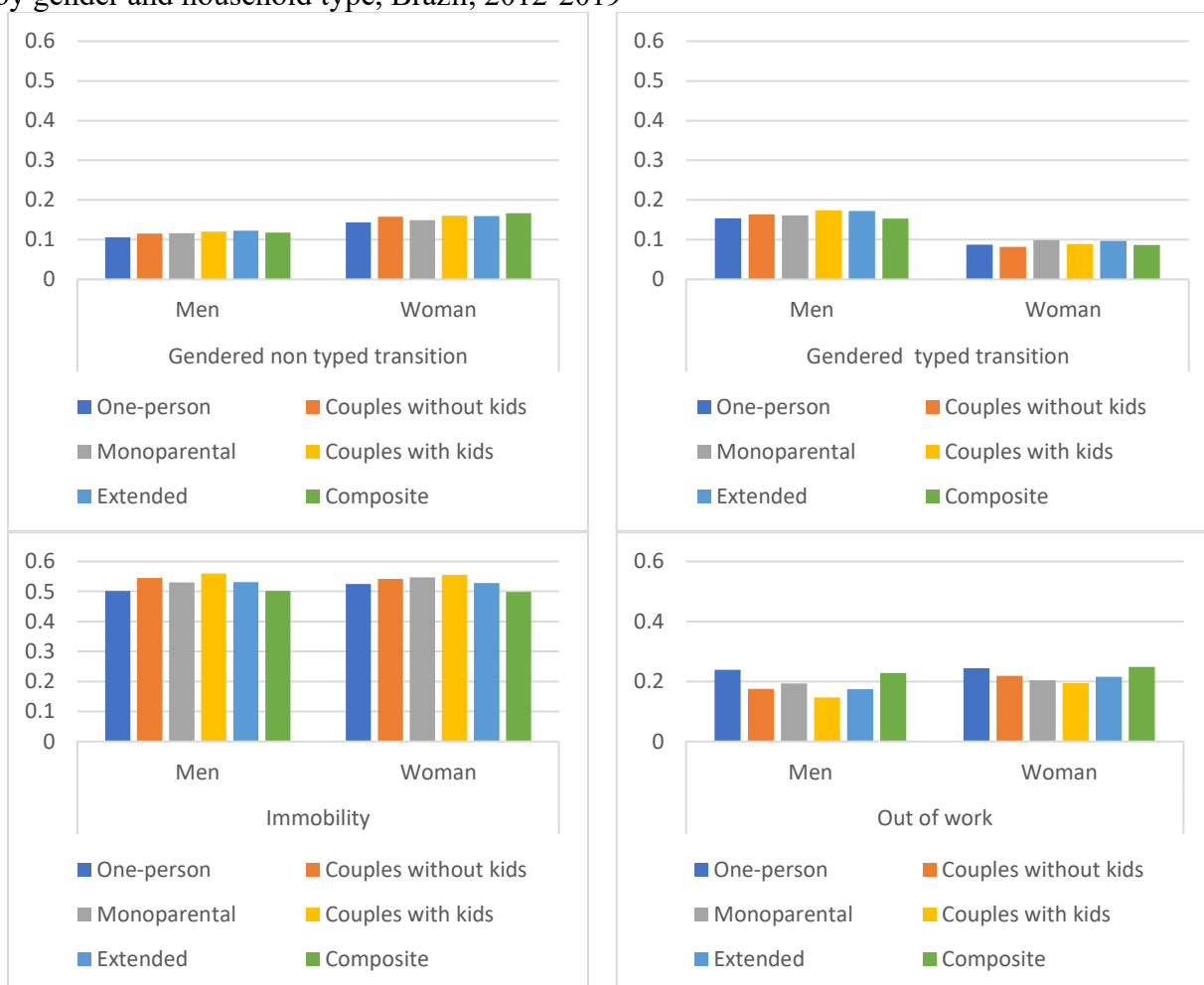
In the case of men, the type of household and their status within it does not have a statistically significant influence on transitioning to predominantly male occupations, except for those living in extended households, who positively impact this likelihood compared to men living alone. Additionally, being a son or residing in a multi-nucleus household (extended or composite) increases the probability of transitioning to a non-predominantly male occupation.

Furthermore, individuals who were not employed in the subsequent interview were more likely to not be the person responsible, or one of them, for their household. Living alone also increases the chances of unemployment. These findings suggest that having dependents is a significant factor influencing individuals' inclination to remain in the same occupation, limiting their opportunities for change that might involve a period of unemployment. This trend holds for both men and women.

Regarding immobility, there is a similar pattern for both men and women when considering the intersection of household types/roles and immobility rates. Being responsible increases the chances of immobility, with higher immobility rates observed in households with couples and sons/daughters.

Figure 7 provides an overview of occupational transitions for men and women, focusing on those responsible or co-responsible for their households. Control for the individual's role in the household helps identify trends in occupational transitions among household types. Controlling for the other characteristics, personal and occupational, transitions to occupations not typically male happens more for men head of extended households or living with spouses and kids, and those living alone are the ones who perform fewer transitions of this type. Also, the women living alone are the ones who perform fewer transitions to non-female occupations. People living alone are also the ones to be out of work more frequently, along with the heads of composite household, being them women or men.

Figure 15 - The predicted probability of state in the second observation of household's reference, by gender and household type, Brazil, 2012-2019



Source: Authors' calculation based on PNADc 2012-2019.

While some patterns can be found, the household composition does not seem to be a critical factor in the occupational movements of Brazilian workers. This aligns with previous research by Chan (1999) and Trappe and Rosenfeld (2004), who found no significant impact of marital status on mobility between male-dominated, female-dominated, and integrated occupations. The impact of motherhood on occupational transitions has been found to vary, with studies reporting both an increase (Cha, 2013) and a decrease (Chan, 1999) in the probabilities of transitioning to male-dominated occupations, as well as an increase in the likelihood of exiting the labor force (Cha, 2013) or no impact at all (Torre, 2014). What we can infer from the results is the importance of having someone share household responsibilities for women, as it increases the chances of making occupational transitions in general.

## 5 CONCLUDING REMARKS

The analysis of gendered dynamics in occupational transitions considering the occupational gender intensity provides valuable insights into the labor market experiences of men and women in Brazil, specifically on whether these contribute to a more integrated labor market or not. Our findings reveal patterns and shed light on the role of characteristics from the initial occupation and the workers themselves in shaping the likelihood of transitioning to different types of occupations.

Crucially, the type of transition that women are more likely to make is to gender non-typed occupations, indicating their role in overcoming gender divisions in the labor market. In contrast, gender-typed transitions are the most frequent among men, highlighting the institutional factors and informal social controls that steer men towards predominantly male occupations, hindering occupational integration. In that sense, the occupational changes that women make contribute to a more integrated labor market regarding gender, but the same is not valid for the changes male workers make.

However, the temporal pattern suggests stabilizing the integration movement, possibly influenced by a conservative reaction to the progressive diffusion of gender ideals. Following the overall trend of increase in occupational stability, there is a reduction in transitions outside one's gender-dominant occupation, especially among women. Also, these types of transitions decreased slightly more rapidly in comparison to the gender typed movements of women.

Furthermore, women exhibit higher rates of transitioning to unemployment or leaving the workforce compared to men, which is consistent with the overall pattern in the general population, reinforcing that women face additional challenges and barriers in maintaining stable and fulfilling employment opportunities.

Regarding the initial employment, it is essential to highlight that the hypothesis of independence was not confirmed, and the initial employment type significantly influences a worker's probability of staying in the same occupation, transitioning to a gender typed non-typed occupation, or leaving the workforce. As expected, being in an occupation typical of the worker's gender increases their stability, demonstrating the "holding power" of gender-typed occupations (Trappe & Rosenfeld, 2004). Sharing this same characteristic, gender, with most of the workers in an occupation is also



important for decreasing a female worker's chance of leaving the workforce without entering another employment in the next three months.

When an occupational transition occurs, it is more likely to happen between occupations in the same gender majority category. If a woman is in a female occupation, the probability of moving for another female is bigger than crossing the gender barriers, and workers that are already in gender atypical occupation tend to continue. This pattern is even more apparent for men, resulting in another segregation reinforcement pattern stronger for men than women.

Characteristics of the worker and the initial occupation also have a role in gender (non)typed transition. With age, for women, the likelihood of making gender non-typed transitions decreases. Higher education levels increase the likelihood of transitioning to gender non-typed occupations compared to staying in the same occupation, reinforcing the crucial role of education in increasing gender integration. Also, having an informal type of employment or being self-employed appears to be a more transitory state for women and more of a permanent situation for men since it increases the likelihood of transitioning from one job to another in general for women while increasing the chances of immobility for men.

Finally, although some patterns can be observed, household and family characteristics do not seem to play a significant role in Brazilian workers' occupational movements. One crucial point is having someone to share household responsibilities with. For instance, married women who are co-responsible for the household have smaller probabilities of occupational transitions but are still more prominent than women in unipersonal households. Among men, being a son or residing in a multi-nucleus household, i.e., having other people responsible for the household, increases the probability of transitioning to a non-predominantly male occupation. Furthermore, individuals who were responsible for the household were less likely to be not employed in the subsequent interview, while living alone also increases the chances of unemployment.

Considering all these findings, does occupational mobility contribute to breaking down or reinforcing gender barriers? It appears that occupational transitions indeed reduce the gender segregation of careers, especially the ones performed by women. This pattern, however, is not so clear and does not appear to be intensifying over the years, on the contrary. The change towards a more gender equalitarian society is, also in this perspective, carried more by women than by men, even with incentives provided to them to be in female occupations.

The mechanism that governs the occupational placement between male or female dominated occupations is not necessarily the same one faced when a worker moves between jobs. Looking also at the dynamic angle is fundamental to combating gender segregation levels consistently and effectively. In that case, any equal opportunity policy, or even policies to reduce segregation, should also look at the conditions that may be pressing workers to perpetuate the labor force segregation.

It is essential to analyze wage and compensatory factors of the original and final occupations as a development of the work since workers in female-dominated occupations earn less, on average than workers in comparable male-dominated occupations.

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## APPENDIX

## APPENDIX A - Logistic Regression of women`s and men`s mobility

	Women						Men					
	Gendered non-typed transition		Gendered typed transition		Out of work		Gendered non-typed transition		Gendered typed transition		Out of work	
Gender type occupation	-0.998	***	-0.338	***	-0.381	***	-1.107	***	-0.025	***	-0.110	***
Age - 30 to 34	-0.014		-0.016		-0.139	***	-0.005		-0.051	***	-0.115	***
Age - 35 to 39	-0.032	**	-0.026		-0.284	***	-0.013		-0.095	***	-0.225	***
Age - 40 to 44	-0.050	***	0.024		-0.406	***	0.008		-0.138	***	-0.300	***
Age - 45 to 49	-0.072	***	-0.006		-0.480	***	0.007		-0.193	***	-0.406	***
Age - 50 to 54	-0.036	**	0.006		-0.464	***	0.029		-0.222	***	-0.423	***
Age - 55 to 59	-0.059	**	0.020		-0.357	***	-0.014		-0.292	***	-0.359	***
Age - 60 to 64	-0.063	**	0.024		-0.174	***	-0.024		-0.390	***	-0.159	***
Elementary	0.105	***	0.275	***	-0.070	***	0.239	***	-0.122	***	-0.065	***
High School	0.366	***	0.308	***	-0.137	***	0.560	***	-0.141	***	-0.096	***
College	0.468	***	-0.113	***	-0.363	***	0.749	***	-0.585	***	-0.160	***
Couple without kids	0.065	**	-0.095	***	-0.150	***	0.006		-0.029		-0.404	***
Monoparental – REF	-0.005		0.088	***	-0.230	***	0.041		-0.018		-0.282	***
Monoparental – not REF	0.168	***	0.100	**	-0.049	*	0.136	***	0.006		-0.122	***
Couple with kids – REF	0.052	**	-0.033		-0.301	***	0.017		-0.001		-0.617	***
Couple with kids – not REF	0.144	***	-0.019		-0.208	***	0.075	***	0.008		-0.328	***
Extended – REF	0.103	***	0.101	***	-0.129	***	0.096	***	0.053	**	-0.381	***
Extended – not REF	0.142	***	0.195	***	0.083	***	0.116	***	0.050	**	0.026	**
Composite – REF	0.210	***	0.052		0.078	*	0.111	**	-0.005		-0.048	
Composite – not REF	-0.028		0.086		0.479	***	0.261	***	0.057		0.567	***
Informal	0.029	*	0.202	***	-0.473	***	-0.076	***	-0.219	***	-0.411	***
Self employed	0.170	***	0.055	***	-0.038	***	-0.116	***	-0.391	***	-0.358	***
Full time	0.031	***	-0.068	***	-0.351	***	-0.158	***	-0.250	***	-0.414	***
Public sector	-0.254	***	0.303	***	-0.250	***	-0.083	***	-0.466	***	-0.318	***
2013	0.047	**	0.023		0.037	*	0.064	***	-0.001		0.057	***
2014	-0.045	**	-0.032		-0.089	***	-0.033	*	-0.109	***	-0.082	***
2015	-0.127	***	-0.040	*	-0.132	***	-0.098	***	-0.116	***	-0.134	***
2016	-0.165	***	-0.063	*	-0.082	***	-0.115	***	-0.183	***	-0.106	***
2017	-0.311	***	-0.141	***	-0.205	***	-0.201	***	-0.281	***	-0.157	***
2018	-0.414	***	-0.285	***	-0.260	***	-0.278	***	-0.392	***	-0.211	***
2019	-0.431	***	-0.275	***	-0.165	***	-0.288	***	-0.362	***	-0.092	***
Constant	-0.952	***	-1.813	***	0.467	***	-0.973	***	-0.224	***	0.426	***

Source: Authors' calculation based on PNADc 2012-2019.