Universidade de São Paulo Faculdade de Economia, Administração e Contabilidade de Ribeirão Preto Departamento de Economia Programa de Pós-graduação em Economia Área: Economia Aplicada

# Now what? Are daycare attendance and postpartum depression associated with mother's return to labor market after pregnancy?

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Dissertação apresentada ao Programa de Pós-Graduação em Economia – Área de Concentração: Economia Aplicada, da Faculdade de Economia, Administração e Contabilidade de Ribeirão Preto da Universidade de São Paulo, para obtenção do título de Mestre em Ciências Econômicas.

Universidade de São Paulo – USP

Supervisor: Prof. Dr. Luiz Guilherme Dacar da Silva Scorzafave

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### Abstract

#### Now what? Are daycare attendance and postpartum depression associated with mother's return to labor market after pregnancy?

Key-words: labor market, gender, fertility, postpartum depression, daycare

JEL: Women's participation in the labor market has largely grown in the past century in Brazil and this increase brought up the situation of several women engaged in the market but at some point in life decided to become pregnant. This study aims to understand how daycare attendance and postpartum depression affect women's decision to work after pregnancy. Using cohort data from Ribeirão Preto/SP and São Luís/MA from 2010 of mothers during the prenatal period and follow-up (after birth), we estimate a multinomial logit on work decision after birth (formal work, informal work, or not work). We find that postpartum depression diminishes mothers' chance to work after birth, especially to work formally, and this decrease is even bigger if she was already working during pregnancy. Also, we find that daycare attendance increases mothers' chance to work after birth, but it affects more to work formally than informally.

# Resumo

#### E agora? Creche e depressão pós-parto estão associados com o retorno da mãe para o mercado de trabalho?

Palavras-chave: mercado de trabalho, gênero, fecundidade, depressão pós-parto, creche

JEL:A participação das mulheres no mercado de trabalho cresceu muito no século passado no Brasil e esse aumento trouxe à tona a situação de várias mulheres engajadas no mercado, mas em algum momento da vida decidiram engravidar. Este estudo tem como objetivo compreender como a frequência à creche e a depressão pós-parto afetam a decisão das mulheres de trabalhar após a gravidez. Utilizando dados de coortes de Ribeirão Preto/SP e São Luís/MA de 2010 de mães durante o pré-natal e acompanhamento (após o parto), estimamos um logit multinomial na decisão do trabalho após o nascimento. Constatamos que a depressão pós-parto diminui a chance de as mães trabalharem após o parto, especialmente para trabalhar formalmente, e essa diminuição é ainda maior se ela já estava trabalhando durante a gravidez. Além disso, verificamos que a frequência à creche aumenta a chance de as mães trabalharem após o nascimento, mas afeta mais o trabalho formal do que informal.

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# 1 Introduction

Women's participation in the labor market has grown in Brazil since the last century, increasing from 40.2 % to 61.6% between 1982 and 2015. But this increase was not similar among women. It was higher for wealthier women and for those living in urban areas. Also, 40% of women are working in only three activities: commerce, domestic service and education. Despite this increase in labor market participation, women are still socially responsible for the domestic work and the care of children (IBGE, 2010; Melo et al., 2007; Scorzafave & Menezes-Filho, 2001; Soares, 2000).

This increase in labor force participation brought up the situation of several women that engaged in the labor market but at some point in life decided to become pregnant. In face of pregnancy, how women will decide to supply their labor force? Pazello, 2006 found that the exogenous shock of having a baby negatively impacted the woman's probability of working after pregnancy, but only in the short term. In addition, no long-term impact was found on wages or hours of work.

Brazil has a huge informal labor market, with about  $31.2\%^1$  of women in it. Maternity leave is not available for women working in the informal sector and it hinders their return to the labor market after pregnancy. Women in a formal job (where they have the right to maternity leave) have 13% more chances to be working post-birth than the ones without this right Alves et al., 2017. In contrast, Carvalho et al., 2006 found that the increase in maternity leave time from 90 to 120 days had little impact on women's wages and participation in the labor market. So, it seems that increasing a benefit for those who are already covered by maternity leave is less effective than promoting formal job growth, at least in terms of female labor supply after pregnancy.

When a woman has a baby, her decision to work involves several as-

 $<sup>^1</sup>$   $\,$  According to PNAD data for 2011.

pects besides pecuniary remuneration. Baby adequate development, using daycare services, sharing domestic work, and having a partner are some factors that can affect a woman's decision. In addition, the process of having a baby can be very stressful, the hormonal roller coaster added to the social expectation of unconditional love and care can result in postpartum depression, that in Brazil is likely to reach 26% of mothers (Filha et al., 2016).

So how women will choose to continue in the labor market after pregnancy? Or how will they decide to enter it? Understanding this new moment in women's lives and which aspects encompass this decision is our main purpose. Using an innovative dataset, we will focus on two aspects that are related to mothers' decision: postpartum depression and daycare.

To investigate these aspects, we use data from a cohort of babies born in 2010 in Ribeirão Preto/SP and São Luís/MA. This data belongs to the BRISA Project which aims to follow people throughout their lives to better understand how health conditions from the intrauterine period and at birth can influence health at older ages. So, the cohort follows mothers from prenatal care until one to three years after birth. We have data on mothers' health, socioeconomic status, and demographic aspects.

To understand the mothers' labor supply decision after pregnancy we estimate a multinomial logit on her work status and we find that having a child in daycare service is positively associated with working after pregnancy. On the other hand, those women that have postpartum depression were less likely to work post-birth. Having a child in daycare service increases the chance of the mother to work formally more than informally after pregnancy. But, having postpartum depression only decreases mothers' chances to work formally. The intensity of these relationships depends on their context. If they are in a more adverse situation<sup>2</sup> this impact is more intense.

 $<sup>^2\,</sup>$  Are less educated, not have a partner, her child development is at risk and she concentrates the housework chores.

This paper is divided into four sections beyond this introduction. The first one discusses women's participation in the labor market; the second one describes data and methodology used in this study. The third section presents the results and the discussion of them. Finally, we have a conclusion.

# 2 Labor Market for Women

#### 2.1 Female Participation in the Brazilian Labor Market

Given the goal of the paper is to understand women's decision to work in the labor market after pregnancy, it is important to first explain the context of the labor market for women. It is also critically important to comprehend the decision-making theory of labor supply and how this fits into a woman's life cycle. Then, after realizing all this context, we hypothesize about some significant aspects that affect women's return to the labor market after pregnancy.

Women's participation in the labor market has increased intensely since the 1970s in Brazil, which can be due to wage increase, raise in women's education level, service sector expansion, and the progressive break in the social role of women. During the 90's, the service sector expanded and with that many job opportunities in this sector emerged. As this sector is dominated by women (a higher percentage of women in it), its expansion resulted in a greater demand for the female workforce (Guedes, 2010).

The increase in a woman's education level leads to an increase in her productivity and also signals market of her skills and productivity. As Scorzafave and Menezes-Filho, 2001 found, education was one of the main reasons for the increase in women's labor market participation rate between 1982 and 1997.

Historically, the social role of women has been focused on reproduction and care, which has kept them within the domestic sphere, but they are slowly conquering space in the political and productive scenes. This conquest has led women to be accepted in these environments, but they have not yet been dissociated from domestic work, which often leads to a double shift (Melo et al., 2007). As more women are participating in the labor market and becoming more qualified, more and more they start to respond to salary increases, and less and less to the occupation and salary of the spouse. During the last two decades of the 20th century, there was a decrease in the wage gap between men and women, and being married started affecting less the decision to offer work (Hoffmann & Leone, 2004; Scorzafave & Menezes-Filho, 2001)<sup>1</sup>.

In the last century, the female participation rate in the Brazilian labor market increased by  $13.8^2$  percentage points, reaching 54.0% in 1997. In a more recent period, in 2012, it reached 61.0% (Barbosa, 2014; Scorzafave & Menezes-Filho, 2001). However, this raise was more accentuated for the wealthier women<sup>3</sup> and it was also concentrated in urban areas (Barbosa, 2014).

Also, according to IBGE, 2010, in 2010, the major occupations that women were concentrated in are elementary ones<sup>4</sup>, service workers, shop and market vendors, and science professionals and intellectuals with 24%, 21.4% and 13.8%, respectively. Now, according to activity sectors, the top three sections that women are concentrated in are commerce, domestic service, and education, with 16.7%, 15.1% and 10.1%, respectively.

Still according to IBGE, 2010, the the majority of women were in formal jobs (59.3% have a contract and 9.5% are public or military employees). On the other hand, 31.2% were in informal jobs, without access to labor rights. The numbers of informality are higher for women than for men (26.3%) in 2010.

Lastly, contrasting monthly income of men and women from the top three activities sections that women are most concentrated in (commerce, education and domestic service), in all these three women earn less than

<sup>&</sup>lt;sup>1</sup> This importance of salary increases for female participation in the labor market was found in the USA (Blau & Kahn, 2007).

 $<sup>^{2}</sup>$  Between 1982 and 1997.

<sup>&</sup>lt;sup>3</sup> The poorest women have always been present in the labor market (Barbosa, 2014; Melo et al., 2007).

<sup>&</sup>lt;sup>4</sup> In Elementary Occupations are domestic workers, cleaners, food preparation helpers, vehicle washers, manual window cleaners, service peddlers and the like, garbage collectors, among others.

men. Men have an average monthly income more than 40% higher than women in these three sections. However, only in commerce there are more men than women (17% and 16.7%, respectively) (IBGE, 2010).

So, as seen here, women still are not majoring in the productive sphere, but they are in services and commerce. Also, where women are a majority, they are still paid less than men.

#### 2.2 Theoretical Review of Labor Supply

In order to better understand women's decision-making to enter the market and after pregnancy to reenter it, it is necessary to comprehend the labor supply theory. To do this, we will use the neoclassical labor supply model of Berndt, 1996. The idea here is not to derive a reduced form equation from a structural model of female labor supply, but only to highlight some issues that are specific to it and are important to be taken into account when estimating our equations.

The decision to provide labor is based on a utility maximization process in which the number of goods and the number of hours allocated to leisure are taken into account. The more goods and the more hours of leisure, the greater the individual's utility will be, that is, the marginal utility of goods and leisure is positive, but it grows at decreasing rates. It should be noted that there is a total limit to the number of hours that equals the sum of leisure and working hours.

The individual is also subject to a budget constraint, which is composed of non-labor income, time, the price of goods, and an hourly wage, where spending on goods must equal total income.

The solution to the problem, according to the first-order condition is the point at which the marginal utility ratio (the marginal rate of substitution) equals the relative price ratio.

Note that this solution is called the inner solution, where hours of leisure are less than the total amount of time and the number of goods is positive, i.e., the woman will offer positive hours of work. If the solution to the maximization problem results in a corner solution, all the time is spent on leisure and the woman will not offer any hours to work at the prevailing relative prices. In other words, the marginal utility ratio is bigger than the relative price ratio.

The marginal rate of substitution of goods and leisure represents how much the woman demands in real terms (how many goods) in exchange for one hour of her leisure time. This value is called the reservation wage. When the woman decides to offer zero hours of labor, this means that her reservation wage is higher than the prevailing wage. Thus, the woman will offer work when the prevailing wage offered is greater than her reservation wage.

Now, in a context where the woman has just become a mother, she now has one more activity: childcare. One implication is that she gets less leisure (*ceteris paribus*) and, so, her marginal utility of leisure increases. A possible result of this would be the exit of this mother from the labor market, as her reservation wage is now higher than the actual wage.

Another implication is for the mother to supply fewer hours of work (*ceteris paribus*), so that the marginal utility of leisure remains the same and, consequently, the marginal rate of substitution remains the same. Thus, if she was already in the labor market, she will remain in it, but offering fewer hours of work.

It is worth noting that, in the Brazilian labor market, informal jobs in general are those that allow greater flexibility for the number of hours to be worked. On the other hand, an informal job is characterized by greater insecurity and non-coverage by employment protection legislation<sup>5</sup>.

Still, a third possibility is delegating childcare, for example, enrolling the child in a daycare center. In this case, the amount of time allocated to labor would remain the same and, *ceteris paribus*, the marginal rate

<sup>&</sup>lt;sup>5</sup> In Brazil, informal work does not have an official definition, but it is commonly understood as work without a signed contract and self-employed.

of substitution would also remain the same<sup>6</sup>. This would imply that she would still be willing to offer labor at the prevailing prices.

It is important to point out that historically, in a household, women are the ones responsible for household chores and childcare (Barbosa, 2018). This allows us to assume that when a couple has a child the woman becomes responsible for his or her care. So, even though there are more working women now than in the past, this number could be even bigger with more equal division of household responsibilities.

One way to understand this difference, through the model described above, is in the difference in reservation wages between men and women. Since men are much less engaged than women in housework and childcare, their reservation wages are lower. Thus, as Berndt, 1996, p.6 "among a group of people with identical potential wages, those with lower reservation wages are more likely to participate in the labor force." That is, for a man with identical skill and productivity as a woman, the man will be more likely to be employed.

#### 2.3 Women Life Cycle and the Decision to Become Mothers

Furthermore, it is necessary to explain the context of the life cycle in which women find themselves when making decisions about entering and re-entering the labor force. Since the aim of the study permeates the decision to work in the labor market, we will understand the life cycle of women over the age of 18.

In this context, they can choose to invest in human capital, i.e., spend more years studying, or enter the market. Also, if the woman is married or has a non-labor income, she can choose to dedicate herself only to domestic work.

During a woman's 20 to 30 years of age, she, in general, can get married, have a child (or children) and invest in her career. As previously

<sup>&</sup>lt;sup>6</sup> This is a simplified explanation because women would still need to allocate some of her time in childcare, especially in the first months after pregnancy.

mentioned, women have the social role of taking care of the household and the children. So, by choosing to get married and become a mother, they might have a double, or even triple, workload<sup>7</sup>. This can make it difficult to invest in one's career.

Consequently, the woman focused on her career may postpone marriage and motherhood. Since the 19th century, the advent of time-saving technologies, such as the microwave, vacuum cleaner, and frozen foods, allows women to dedicate less and less time to domestic work. In fact, there has been a decrease in the hours of domestic work by Brazilian women, according to Barbosa, 2018. However, this study did not indicate whether the drop was due to the advent of these technologies.

Another disruptive technology for women's decision-making power was the birth control pill. Although other contraceptive methods already existed, the pill gave women the power of contraception and also shifted the contraceptive moment to before the sexual act<sup>8</sup>. The pill, then, allowed both young women to invest in human capital and their careers by postponing motherhood, and also allowed women who were already mothers to control the number of children. Bailey, 2006 study found that, in fact, access to the pill increased female participation in the labor force and also increased the number of worked hours.

In addition, since women's social role has historically assigned them the responsibility of caring for their children, when they become mothers, women begin to dedicate part of their time to this task. This can cause them to leave the labor market for some period or indefinitely and, as Pazello and Fernandes, 2004 found, motherhood has a negative impact on women's participation in the labor market.

So, for women to return to work or start working, this care must be delegated or for there to be an equal division of this responsibility because,

<sup>&</sup>lt;sup>7</sup> It is worth noting that the marriage expected here is the heterosexual one. It is possible that in homosexual marriages the division of domestic labor is more equal between both parties.

<sup>&</sup>lt;sup>8</sup> Other available methods such as the condom and the diaphragm are used at the moment of coitus, which, because of the heat of the moment, can have their effectiveness reduced.

otherwise, they will be overloaded with a double workday. In this context, the role of daycare is fundamental for women to be able to work after pregnancy and invest in their careers.

Motherhood is a time of great happiness but it also brings great challenges and changes to a woman's life. When having a child, a woman goes through a hormonal roller coaster, emotional fragility, and intense care for her child. All these factors can help develop postpartum depression (Azevedo & da Rocha Arrais, 2006; Patel et al., 2012).

As the present study aims to understand this return (or insertion) of women into the labor market, in the following chapters we will focus on the two topics raised here that are crucial to this moment: postpartum depression and daycare.

#### 2.4 Postpartum Depression

Postpartum depression is a major international public health problem that affects at least one in eight mothers and their children after childbirth worldwide. Etiology is still unclear but hormonal changes play a role in it. Also, the process of pregnancy and childbirth represents such a stressful life events and some psychosocial stressors like marital conflict, lack of perceived social support, history of mental illness, childcare related stressors and others, have been identified in the development of postpartum depression (Patel et al., 2012).

In the last centuries, society has created a role of maternity in which a woman needs to give herself completely, make sacrifices, be kind, loving, patient, and feminine. Furthermore, this mother has an automatic love for her child and is satisfied with her care. However, this is not the reality for many women (if not all of them) and this shock with the experience of motherhood can lead to contradictory and irreconcilable feelings between the idealized image of motherhood, dictated by the culture, and the lived experience (Azevedo & da Rocha Arrais, 2006). Still, there is an unequal division of domestic and care work, which, even though it has been diminishing with time, overloads women. Thus, in the baby's first years, the mother goes through a great physical and emotional demand. The physical demand of sleepless nights, for example, added to baby care, housework, and the feeling of inability to adapt to the romanticized vision of motherhood can lead to feelings of guilt and anxiety, making them more predisposed to postpartum depression.

Among the symptoms of this mental illnes, we point loss of interest in daily activities, constant indisposition, difficulty in concentrating and making decisions, anxiety, and excessive worry (Gurudat, 2014; Patel et al., 2012; Selix & Goyal, 2015). Faced with these conditions, it is not easy to decide whether to return or enter the job market.

By going to work, the mother will be away from her child, which can be stressful, and she will also have more of her time dedicated to working. This new demand will result in a double workday, which can be exhausting, especially if the work environment is not prepared to deal with the routine of a woman in the maternity period (Selix & Goyal, 2015).

Moreover, as society believes that motherhood is a time of pure happiness, women with postpartum depression are not understood. When added to the difficulty of inserting this new demand of work, the result can be a poor performance at work and absenteeism, causing herself and her coworkers to blame her for the illness (Selix & Goyal, 2015).

The mother may also choose not to work in the market. By making this choice, she may be giving up her career or postponing it. By working, she would fulfill her social needs, and not returning to work can generate an absence of the satisfaction she has for her career, which can also cause her to develop postpartum depression (Gurudat, 2014).

It is possible to see, then, that this issue is not simple and is present in the lives of many women, but it is little addressed in the economic literature on the labor supply. This gap prevents us from better understanding how the process of a woman's reintegration into the labor market after a pregnancy is.

One hypothesis is that the mother with postpartum depression may not be in good enough health to return to or enter the workforce. In addition, companies that do not understand motherhood with all its complexity do not provide a receptive, friendly, and appropriate environment for mothers to work in.

In this way, companies can invest in creating a more welcoming environment for mothers and can understand their new needs, such as providing a space for breastfeeding, accepting unexpected absences due to some emergency with the child, and can even provide a local psychological service, where they can talk about her difficulties and conflicts.

Another possible hypothesis is that the period in which the mother had to take time off work because of the newborn may have affected her happiness or mental health. In other words, working, for the mother, is a social need while taking time off and being limited to childcare and housework may lead her to develop depressive symptoms. Despite her interest in returning, if the work environment is not adapted or prepared for her, she may not be able to do so and her feelings of guilt and incapacity may worsen along with the depressive symptoms.

Therefore, it is critically important that the labor market understands this context of motherhood. In Brazil, the prevalence of postpartum depression is more than 25% (Filha et al., 2016) and, at the limit, this indicates that possibly almost a quarter of the female workforce that has experienced motherhood will remain at work with lower productivity or even leave the labor market.

It is worth noting that there are both private and public costs in not providing an appropriate work environment and conditions for women who have just gone through pregnancy. Low productivity and absenteeism result in higher costs to companies, as do the dismissal and replacement of the mother (Dewa & McDaid, 2011). In the public sphere, mothers who have not been able to re-enter the market may use unemployment benefits, thus generating a cost for the government.

#### 2.5 The Importance of Daycare

Women are historically responsible for the care and domestic chores, so when they become a mother, they are charged with most (if not all) of the childcare, and one way to share this task enrolling the child in daycare.

Daycare has numerous functions in society, which include early childhood development and also the shift of the child's care to others. Although the service is very important for children's development, here we choose to focus on its role for the mother.

By enrolling the child in daycare, the mother has more time and flexibility to be able to choose whether working in the market or even how many hours to do so. In other words, this means a reduction in the reservation wage, which can result in their insertion in the labor market, if it is reduced to the point of being below the market wage. It is also worth mentioning the simultaneity of choosing to work with entering daycare, in which the woman can put her child in daycare because she wants to work or because her child went to daycare, she chose to work, indicating the strong and positive connection between both (Barbosa & Costa, 2017; Costa, 2007).

Besides the mother's interest in enrolling her child in daycare, there is a previous fundamental step: access. The offer can come from the private or public sector, and the existence of both is relevant since the supply of one helps not overload the other. In addition, the public and, therefore, free supply of daycare centers is of utmost importance because it allows poorer mothers to share this care work and, thus, allocate their time to paid work, which improves the family income level<sup>9</sup>.

<sup>&</sup>lt;sup>9</sup> An alternative to providing free public daycare centers are the daycare vouchers, which are a kind of vouchers given to families to pay for their children's education in the private sector. Despite the

In Brazil, the provision of free public daycare is essential, since 64% of the population lives on up to one minimum wage per month and can hardly afford it<sup>10</sup>. In fact, Castro, 2009 study on inequality in education in Brazil shows that the poorest 20 percent have a daycare attendance rate of 10.2 percent, while the richest 20 percent have a rate of 36.2 percent. Furthermore, the rate of female participation in the labor market is lower for the poorest households, which reinforces the importance of free access to daycare (Barbosa, 2014; Costa, 2007; Hoffmann & Leone, 2004; Ramos & Soares, 1995).

Another way to share the duty of child care is to delegate some of it to older children. In this context, the mother can work part of the day while the siblings take care of the younger baby. However, there are three caveats to this: firstly, this is only possible when the woman has more than one child and the age gap must be at least more than a decade; the second one is that this care is not equivalent to quality education; lastly, it falls on women again, since it is the daughters who are responsible for the care (Barbosa, 2014; Barbosa & Costa, 2017; Costa, 2007).

Finally, some national studies have found a positive relationship between daycare supply and maternal employability, i.e., an increase in daycare supply is related to an increase in female labor supply (Barbosa & Costa, 2017; Barros et al., 2011; Connelly et al., 1996; Costa, 2007).

Worth noting is Connelly et al., 1996 study in which they tried to understand how different types of non-parental child care, such as part-time (daycare or preschool) and full-time (another family member or friend) affects a woman's decision to work in the marketplace. They found that full-time care is important for the mother's employment and that part-time care is more related to educational quality.

Another important study with Brazilian data was Barros et al., 2011,

lack of evidence of voucher in early years in the literature, Viitanen, 2011 found that consumers reacted positively to the introduction of a private childcare voucher, moving from informal care use to customers of private childcare and that the use of private care increase around 4% for 3-6 years old children.

<sup>&</sup>lt;sup>10</sup> According 2010 Census:https://cidades.ibge.gov.br/brasil/pesquisa/23/24304

in which they evaluated the impact of free daycare on the labor supply of low-income mothers in the city of Rio de Janeiro. They found that access to free daycare significantly increased the number of working mothers (extensive margin). This impact was even greater for new workers, that is, women who were not looking for a job before access to daycare and, after that, started working.

# 3 Data and Methodology

#### 3.1 Data and Treatment

To better understand women's return to the labor market after pregnancy, we used the data from the BRISA Project<sup>1</sup>. The BRISA Project, entitled "Etiological factors of preterm birth and perinatal factors in child health: birth cohorts in two Brazilian cities", is a study that aims to follow people throughout their lives to acknowledge how health conditions from the intrauterine period and at birth can influence health at other periods in life.

Project BRISA is characterized as a cohort study, i.e., an observational study where participants are followed over time to assess healthrelated outcomes. The Project was initiated in 2010, to follow, throughout various stages of life, children born in that year in the cities of Ribeirão Preto/SP and São Luís/MA. The project data are collected at three points in time: prenatal, at birth, and follow-up (shortly after birth).

The BRISA Project in Ribeirão Preto/SP is conducted by the team from the Center for the Study of Child and Adolescent Health (NESCA), located at the School of Medicine of Ribeirão Preto/USP. Currently, the project is coordinated by Prof. Dr. Heloisa Bettiol, Prof. Dr. Marco Antonio Barbieri, Prof. Dr. Viviane Cunha Cardoso, Prof. Dr. Maria da Conceição Saraiva and Prof. Dr. Ricardo Cavalli.

In São Luís/MA, the Project is conducted by four researchers from Federal University of Maranhão (UFMA): Prof. Dr. Marizélia Rodrigues Costa Ribeiro, Prof. Dr. Antônio Augusto Moura da Silva, Prof. Dr. Rosângela Fernandes Lucena Batista and Prof. Dr. Vanda Maria Ferreira Simões.

Although the focus of The BRISA Project is to study the children's health, there is information about mothers before and after birth, which allows us to investigate the subject already mentioned.

Pregnant women, users of public and private prenatal services and who wanted to give birth in the municipality where data collection took place, were invited to participate in the study if the following criteria were met: gestational age of fewer than 22 weeks, an obstetric ultrasound performed with less than 20 weeks of gestational age and singleton pregnancy. The cohort data were stratified by maternity unit, those selected if there were more than 100 deliveries per year and each one had a data share proportional to the number of deliveries.

Convenience samples were studied in the two municipalities due to the difficulty of obtaining a random sample from the population of pregnant women. Data collection was performed from the 22nd to the 25th week of gestational age. From February 2010 to June 2011, 1,447 pregnant women participated in the BRISA cohort in São Luís. In Ribeirão Preto, the sample consisted of 1,400 pregnant women whose data were collected from February 2010 to February 2011. Of these, 1079 were followed at birth (stage two) and follow-up (stage three) in Ribeirão Preto and 1149 in São Luís. The follow-up took place from one to three years after birth, and during this period the baby was transitioning from a newborn to a toddler, meaning that he was no longer as dependent on the mother.

This rich data contains information beyond maternal health, such as socioeconomic and demographic factors, postpartum depression, household division of labor, daycare, baby development, and others. In our study, for socioeconomic and demographic factors, we used information about the mother's race, income level, education level, number of children, marital status and employment status.

For mother's race, we classified black as black and brown women and non-black the rest, white and yellow. To acknowledge her income level, we use the density of residents per room during the pregnancy period. The educational level is categorized into illiterate/elementary/middle school, high school, and undergraduate complete/incomplete. The marital status was observed according to whether she was married (married or living together) or not (single, divorced or widow) after the pregnancy period<sup>2</sup>.

Now, for the mother's employment status, we use information about her participation in the labor market and the type of work. For participation, we used the question "Do you have any paid activity inside or outside the home?", that allowed us to capture if the woman was working or not, but it didn't show if she was unemployed and looking for a job. This information was obtained during pre-natal stage and after birth. To capture type of work we used the question "What is the working relationship?" and we considered informal work if the answer was self-employed or side-hustle<sup>3</sup> and formal if was hired or employer.

To check postpartum depression, the Edinburgh Postnatal Depression Scale (EPDS) instrument was used. The EPDS is a self-report instrument to track depression after pregnancy consisting of 10 questions, whose answers were scored from zero to three according to the presence or intensity of the symptom. Its items cover psychic symptoms such as depressed mood (feelings of sadness, self-worth and feelings of guilt, ideas of death or suicide), loss of pleasure in activities previously considered pleasant, fatigue, decreased ability to think, concentrate, or make decisions, in addition to physiological symptoms (insomnia or hypersomnia) and behavioral changes (crying spells). The sum of the points adds up to a score of 30; if the score was greater than or equal to twelve, the presence of depressive symptoms was considered (Morais et al., 2017).

Another social aspect is the household chore division, that was obtained from the question "In your home, who does the housework for your family?" that was summarized in "You do (the mother) all the work" or "You do (the mother) some of the work".

For baby matters, we look at the baby's development and if he or she

<sup>&</sup>lt;sup>2</sup> The Pearson correlation between being married during pregnancy and after was 0.5167 and 0.556 for Ribeirão Preto and São Luís, respectively. But, focusing on our interest, we only kept marital status after pregnancy.

<sup>&</sup>lt;sup>3</sup> Free translated from "faz bico"

is in daycare. Regarding the baby's development, the Bayley III Child and Child Development Scales instrument was used. This scale is calculated for five domains (cognitive, receptive communication, expressive communication, fine motor and gross motor). Each of these domains classifies the baby as competent, emerging and at-risk, and we use a dummy to check if he is at risk in at least one domain. Furthermore, we use the baby's age to control the period in which the interview after birth took place.

All these aspects are summarized in Table 1 and if the answer was "don't know" we classified it as missing. Since we want to investigate women's participation in the labor market after pregnancy, we only kept women over the age of 18. Also, we kept the data without missing, resulting in a sample of 889 women from Ribeirão Preto and 856 from São Luís.

| Name                          | Definition  |  |
|-------------------------------|---|--|
| Black                         | Black and Non-black                                   |  |
| Mothers' education            | Illiterate/elementary/ middle school, High school and |  |
|                               | Undergraduate complete/incomplete                     |  |
| Density no. resident per room | Proxy to income level                                 |  |
| Married after preg.           | Married or Not married on prenatal or on follow-up    |  |
| Mother's age                  | Mother's age in years                                 |  |
| Baby's age                    | Baby's age in months                                  |  |
| Number of children            | 1 to 7 number of children                             |  |
| On daycare                    | Baby on daycare and Not on daycare                    |  |
| Working                       | Not working, Formal working and Informal working on   |  |
|                               | prenatal or on follow-up                              |  |
| Does all the housework        | Does all the housework and Share de housework         |  |
| At least one domain at risk   | Baby's development: At least one domain at risk and   |  |
|                               | No risk in any domain                                 |  |
| Postpartum depression         | Postpartum depressive symptoms and No postpartum      |  |
|                               | depressive symptoms                                   |  |

Table 1 – Variables used

Source: Elaborated by the authors.

As said before, the follow-up took place from one to three years after birth, but it was different between the cities. As we can see in the Graph 1 the follow-up stage in São Luís occurred before Ribeirão Preto.





Source: Cohort Brisa 2010. Elaborated by the authors.

#### 3.2 Sample Characterization

Since our goal is to understand which aspects affect women's decision to work after pregnancy, we will first analyze their participation in the labor market. As we can see in Table 2, considering the full sample, the percentage of women working did not change after having a baby. However, while in Ribeirão Preto, there is a 10 percentage points increase in women working after pregnancy, in São Luís we have a decrease of the same magnitude. In Table 3, we have information that allows to understand better this different trend of the cities. First, considering women that were not working during pregnancy. In Ribeirão Preto, there is a higher fraction of those women that were working after pregnancy than in São Luís (44.55% vs 22.81%) Additionally, considering women that were working during pregnancy, there is also a higher proportion of them working after pregnancy in Ribeirão Preto (75.95%) than in São Luís (55.25%).

For those women who are working, it is our purpose to know how the distribution between formal and informal work during and after pregnancy evolves. There are no significant differences in this division in both

|                | During pregnancy | After pregnancy |
|----------------|------------------|-----------------|
|                | Working          | Working         |
| Ribeirão Preto | 50.51            | 60.40           |
| São Luís       | 46.73            | 37.97           |
| Full sample    | 48.65            | 49.40           |

Table 2 – Women working during and after pregnancy (%)

Source: Cohort Brisa 2010. Elaborated by the authors.

Table 3 – Labor status after pregnancy according to labor status during pregnancy (%)

|                  | Ribeirão Preto  |         | São Li      | ıís     |
|------------------|-----------------|---------|-------------|---------|
|                  | After pregnancy |         |             |         |
| During pregnancy | Not working     | Working | Not working | Working |
| Not working      | 55.45           | 44.55   | 77.19       | 22.81   |
| Working          | 24.05           | 75.95   | 44.75       | 55.25   |

Source: Cohort Brisa 2010. Elaborated by the authors.

cities: São Luís has a smaller formalization rate than Ribeirão Preto as we can see in Table 4. The BRISA figures for informality are slightly smaller than those from Brazilian Populational Census: in 2010, in the same age group, 51% of female workers in São Luís were in informal jobs, and 29% in Ribeirão Preto<sup>4</sup>.

|                | During pregnancy |                  | After p        | regnancy         |
|----------------|------------------|------------------|----------------|------------------|
|                | Formal working   | Informal working | Formal working | Informal working |
| Ribeirão Preto | 73.94            | 26.06            | 71.32          | 28.68            |
| São Luís       | 54.25            | 45.75            | 55.69          | 44.31            |
| Full sample    | 64.66            | 35.34            | 65.43          | 34.57            |

Table 4 – Type of jobs among working women (%)

Source: Cohort Brisa 2010. Elaborated by the authors.

Regarding the transition of work status from pregnancy to after pregnancy, Table 5 shows that in Ribeirão Preto, for example, after pregnancy, more women went to formal jobs rather than to informal ones, as we can see with a bigger concentration of women formally working after pregnancy. But the opposite happened in São Luís, where more women went to informal jobs after pregnancy.

<sup>&</sup>lt;sup>4</sup> In Census, informal work encompasses all jobs without a signed contract plus the self-employed plus unpaid. Formal work encompasses all formal jobs plus military, statutory civil servants and employers.

|                  | Ribeirão Preto  |        | S        | ão Luís     |        |          |
|------------------|-----------------|--------|----------|-------------|--------|----------|
|                  | After pregnancy |        |          |             |        |          |
| During pregnancy | Not working     | Formal | Informal | Not working | Formal | Informal |
| Not working      | 55.45           | 32.27  | 12.27    | 77.19       | 10.09  | 12.72    |
| Formal working   | 23.80           | 61.45  | 14.76    | 38.71       | 50.69  | 10.60    |
| Informal working | 24.79           | 31.62  | 43.59    | 51.91       | 13.66  | 34.43    |

Table 5 – Transition of labor market participation by type of work (%)

Source: Cohort Brisa 2010. Elaborated by the authors.

Note: Sum of the line equals one hundred percent for each city.

Looking at some demographic aspects, we can see in Table 10 that the majority of the full sample is married and black, but in Ribeirão Preto most of them are non-black, while the opposite happens in São Luís. Another aspect of our sample is that it has a high level of education, in which most of the mothers have a high school education, and this percentage is even higher in São Luís. This goes along with 2010 Census, in which most of the women, from both São Luís and Ribeirão Preto have high school.<sup>5</sup>

| Ribeirão Preto | São Luís  | Full sample   |
|----------------|---|---|
| 29.70          | 19.98   | 24.93   |
| 81.89          | 79.91   | 80.92   |
| 45.78          | 84.35   | 64.70   |
| 26.55          | 11.92   | 19.37   |
| 66.82          | 77.92   | 72.26   |
| 6.64           | 10.16   | 8.37  |
| 52.08          | 51.29   | 51.69   |
|                | Ribeirão Preto         29.70         81.89         45.78         26.55         66.82         6.64         52.08 | Ribeirão PretoSão Luís29.7019.9881.8979.9145.7884.3526.5511.9266.8277.926.6410.1652.0851.29 |

Table 6 – Socioeconomic, demographic and health aspects (%)

Source: Cohort Brisa 2010. Elaborated by the authors.

One more point is that more than half of women do all the housework, which is disadvantageous for entering the labor market. Also, this shows that the division of household chores responsibility remains as being exclusive to women in many families.

Related to mother's health, we can see a expressive number of 25% of women with postpartum depressive symptoms and this is a likely number

<sup>&</sup>lt;sup>5</sup> According with 2010 Census data for women in same age group as cohort Brisa, 28% are illiterate/elementary/middle school, 56% have high school diploma and 15% have a complete or incomplete undergraduate in São Luís. Now in Ribeirão Preto, 33% are illiterate/elementary/middle school, 40% have high school diploma and 37% have a complete or incomplete undergraduate.

for Brazil, according Filha et al., 2016. From a public health point of view, are these mothers getting the help they need? Also, from the perspective of her reinsertion into the labor market, she may stay away for a longer time or return presenting lower productivity, possibly harming her career and remuneration

From Graph 2, we can see that Ribeirão Preto did not differ much from São Luís. Their mean ages are 29 and 28 years old for Ribeirão and São Luís, respectively, and they are not statistically different<sup>6</sup>. In Ribeirão Preto they are a little bit older than São Luís. Therefore, these women are mostly in a moment of career investment and have passed the moment of investing in their human capital, according to the discussion of women's life cycle.





Source: Cohort Brisa 2010. Elaborated by the authors.

Looking at the aspects of the baby, we can see in Table 7 that the two cities have the same percentage of babies with at least one developmental domain at risk. On the other hand, in Ribeirão Preto, almost half of the babies are in day care, unlike in São Luís, where almost none are<sup>7</sup>.

<sup>&</sup>lt;sup>6</sup> At 1% significance level.

<sup>&</sup>lt;sup>7</sup> Remember that children are assessed at younger ages in São Luís than in Ribeirão Preto. So, this

|                             | Ribeirão Preto | São Luís | Full sample |
|-----------------------------|----------------|----------|-------------|
| On daycare                  | 46.46          | 1.99     | 24.64       |
| At least one domain at risk | 7.42           | 7.94     | 7.68        |

Table 7 – Baby aspects (%)

Source: Cohort Brisa 2010. Elaborated by the authors.

Table 8 – Daycare attendance and labor market participation after pregnancy (%)

|                  | Ribeirão Preto | São Luís | Full sample |
|------------------|----------------|----------|-------------|
| Not working      | 27.56          | 1.69     | 12.00       |
| Formal working   | 61.10          | 1.66     | 42.02       |
| Informal working | 53.25          | 3.47     | 29.19       |

Source: Cohort Brisa 2010. Elaborated by the authors.

As our focus here is to understand the relation between mothers' engagement in the labor market, postpartum depression, and daycare attendance, we separated the data concerning mothers with depression and with children in daycare according to labor market participation after pregnancy in Tables 8 and 9. From the first table we can see that, in Ribeirão Preto, most working women (either formal or informal jobs) had their child in daycare. When we look at the full sample, this result diminishes due to the low rate of daycare attendance in São Luís, as was also seen in Table 7.

Now exploring the distribution of postpartum depression among workers, we can see in Table 9 almost no difference between the rate of postpartum depression in formal and informal workers, but it is noticeable the higher rate of postpartum depression in not working mothers, especially if we look at the cities apart.

#### 3.3 Methodology

To understand how labor market participation after pregnancy is associated with depression and child care, we estimated a multinomial logit,

huge difference reduces a lot if we compare only babies older than 17 months: in this group Ribeirão Preto has 52% of them in daycare and São Luís has 44%. Even with this restriction, the results go along with 2010 Census, which the percentage of children of daycare age who attend the service iis lower in São Luís than in Ribeirão Preto, 27% and 42% respectively.

|                  | Ribeirão Preto | São Luís | Full sample |
|------------------|----------------|----------|-------------|
| Not working      | 32.67          | 22.22    | 26.39       |
| Formal working   | 27.42          | 16.57    | 23.94       |
| Informal working | 28.57          | 15.97    | 22.48       |

Table 9 – Postpartum depression and labor market participation after pregnancy (%)

Source: Cohort Brisa 2010. Elaborated by the authors.

Full sample Ribeirão Preto São Luís Married after pregn. 81.89 79.91 80.92 45.7864.70 Black 84.35 Illiterate/elementary/middle school 26.5511.92 19.37 High school 66.82 77.92 72.26 Undergraduate compl./incompl. 6.6410.16 8.37 Does all the housework 52.0851.2951.69

Table 10 – Socioeconomic, demographic and health aspects (%)

Source: Cohort Brisa 2010. Elaborated by the authors.

where the dependent variable is the women's work status after pregnancy (WAP): informal work, formal work, or not working.

For a more complete comprehension of this issue and contextualized with our sample, we will estimate only one model, but varying the data. That is, first we will analyze our model with the full sample (São Luís and Ribeirão Preto together). Then we will estimate the model separately for each city. Estimating the model with both cities allows capturing which aspects affect women's participation in the labor market more precisely, since the sample is larger and has more variability. On the other hand, we impose a restriction that the relationship between the covariates and the dependent variable is the same in both cities. When we estimate the model separately, we relax this restriction, but the sample size is smaller.

Finally, we will estimate the model with a sub-sample of women who were working during pregnancy, for the cities together and separately. As said before, Brazilian female participation in the labor market increased a lot in the last decades, reaching more than half of women, and, along with that, their employment opportunities also increased. So, we can expect that a woman who were previous working may have more preference to work, under her restrictions, than a woman that wasn't. In order words, they may be different in aspects that we cannot observe. Provided that, it is important to analyze these women separately because their decisionmaking process may differ from non-working women.

This last one will show us what affects women when returning to work after giving birth and also makes it possible to compare results with all women, clarifying which aspects affect these different ones and how it happens. However, it's worth noticing that zooming in on these women can cause a loss of quality in results due to a smaller sample.

We estimate the 3.1 below, which includes economic, demographic, health, and baby characteristics. The  $\mathbf{X}$  matrix, which encompasses the economic aspects, includes work status during pregnancy, a proxy for household income, and mothers' education. The  $\mathbf{V}$  matrix, which encompasses demographic aspects, includes marriage status after pregnancy, mothers' age, the number of children, and if the household tasks are divided or not. The  $\mathbf{Z}$  variable captures postpartum depression observed in the followup stage. Finally, the  $\mathbf{W}$  matrix, which represents information about the babies, includes daycare, development at risk, and the age of the baby.

$$WAP = \beta_0 + \beta_1 \mathbf{X} + \beta_2 \mathbf{V} + \beta_3 \mathbf{Z} + \beta_4 \mathbf{W} + \epsilon$$
(3.1)

After estimating the models, we calculated the predicted probabilities of working after pregnancy for women that had postpartum depression and that have a child in daycare. The other regressors are set according to two situations, a "favorable" and an "unfavorable". These terms are used in the sense that variables favor a higher probability of work. <sup>8</sup>

The "Favorable" case considers woman that has at least undergraduate education, was working in formal sector during pregnancy, is not black, is married, share the housework with other household members, her child is not at risk in development.

<sup>&</sup>lt;sup>8</sup> They are calculated only for the full sample and the return to work (with both cities together). The results for each city separated are in the Appendix.

"Unfavorable" case means be illiterate/elementary/middle school, not working during pregnancy, does all the housework, black, and her child has at least one domain at risk. Also, it is worth mentioning that, when we are considering only mothers who are returning to work, the variable of work during pregnancy stays at informally working, since it can not be not-working.

For both cases, continuous variables are set at their mean.

# 4 Results

The estimated results considering full sample are in Table 11 and those concerning only women that were working during pregnancy are in Table 12<sup>1</sup>. As stated earlier, the dependent variable is "work status after pregnancy" and the reference category is "not-working women". In the estimation with only women who worked during pregnancy, there is an "Informal work" dummy variable capturing work status during pregnancy, with "Formal work" status as the reference group.

Also, the predicted probability according a "favorable" and "unfavorable" set of regressors are in Graphs 3 and 5 for the full sample and also in 4 and 6 for mothers returning to work.

#### 4.1 Postpartum Depression

A very important aspect is mothers' mental health, and this period of pregnancy and motherhood is a very sensitive time, as discussed earlier. Mothers' postpartum depression is negatively associated with working in a formal job after pregnancy, according results in Table 11 and 12. This goes along with the literature, as in Selix and Goyal, 2015, inflexible and stressful work environments can increase the risk of developing postpartum depression.

As mothers of babies are sleep-deprived, with intense physical and emotional demands, and trying to deal with the reality shock of motherhood, working in a stressful environment and with strict hours and lower (or even none) flexibility can help women to develop postpartum depres-

 $<sup>^1~</sup>$  These tables reported marginal effects of multinomial logit estimation. Estimated coefficients are in the appendix in Tables 13 and 14

|                                   | Full sample    |                | Ribeirão Preto |                | São Luís      |               |
|-----------------------------------|----------------|----------------|----------------|----------------|---------------|---------------|
|                                   | Formal         | Informal       | Formal         | Informal       | Formal        | Informal      |
| Postpartum depression             | -0.0490**      | -0.0303        | -0.0607*       | -0.0176        | -0.0348       | -0.0543*      |
|                                   | (0.0227)       | (0.0197)       | (0.0335)       | (0.0264)       | (0.0312)      | (0.0282)      |
| On daycare                        | $0.158^{***}$  | $0.0659^{**}$  | 0.208***       | 0.0404         | -0.0453       | 0.0529        |
|                                   | (0.0305)       | (0.0279)       | (0.0328)       | (0.0260)       | (0.0926)      | (0.0843)      |
| Formal working                    | $0.301^{***}$  | -0.00518       | 0.257***       | -0.00365       | $0.355^{***}$ | -0.0133       |
|                                   | (0.0266)       | (0.0197)       | (0.0368)       | (0.0270)       | (0.0396)      | (0.0291)      |
| Informal working                  | 0.00273        | $0.226^{***}$  | 0.000143       | $0.251^{***}$  | 0.0255        | $0.200^{***}$ |
|                                   | (0.0285)       | (0.0306)       | (0.0503)       | (0.0493)       | (0.0296)      | (0.0383)      |
| Density no. resident per room     | $-0.0211^{*}$  | 0.000933       | -0.0299        | -0.0120        | -0.0130       | 0.0137        |
|                                   | (0.0121)       | (0.0102)       | (0.0192)       | (0.0158)       | (0.0147)      | (0.0130)      |
| High school                       | $0.0612^{**}$  | -0.0313        | $0.0724^{*}$   | -0.0349        | 0.0599        | -0.0246       |
|                                   | (0.0263)       | (0.0249)       | (0.0375)       | (0.0314)       | (0.0411)      | (0.0412)      |
| Undergraduate compl./incompl.     | $0.124^{***}$  | $-0.0677^{*}$  | 0.0676         | -0.0777        | $0.134^{**}$  | -0.0554       |
|                                   | (0.0451)       | (0.0366)       | (0.0720)       | (0.0488)       | (0.0587)      | (0.0569)      |
| Black                             | 0.0175         | -0.0161        | 0.0126         | -0.0262        | 0.0173        | 0.00999       |
|                                   | (0.0222)       | (0.0203)       | (0.0310)       | (0.0245)       | (0.0339)      | (0.0341)      |
| Married after preg.               | $-0.137^{***}$ | 0.00276        | -0.127***      | 0.0217         | -0.139***     | -0.0229       |
|                                   | (0.0273)       | (0.0222)       | (0.0411)       | (0.0311)       | (0.0353)      | (0.0322)      |
| Mother's age                      | -0.00174       | $0.00409^{**}$ | -0.00701**     | $0.00572^{**}$ | 0.00298       | 0.00202       |
|                                   | (0.00210)      | (0.00177)      | (0.00323)      | (0.00246)      | (0.00260)     | (0.00257)     |
| Number of children                | 0.00274        | 0.0128         | 0.0241         | 0.00366        | -0.00952      | 0.0202        |
|                                   | (0.0134)       | (0.0107)       | (0.0196)       | (0.0150)       | (0.0189)      | (0.0153)      |
| Does all the housework            | $-0.0441^{**}$ | -0.0206        | -0.0836***     | -0.0287        | -0.0145       | -0.0000223    |
|                                   | (0.0203)       | (0.0176)       | (0.0312)       | (0.0247)       | (0.0256)      | (0.0255)      |
| Baby's age (months)               | 0.00329        | 0.00420        | 0.00130        | 0.000550       | 0.00579       | $0.0123^{**}$ |
|                                   | (0.00365)      | (0.00323)      | (0.00491)      | (0.00385)      | (0.00610)     | (0.00573)     |
| At least one domain at risk       | 0.0246         | $-0.0631^{**}$ | 0.0603         | -0.101***      | -0.00887      | -0.0333       |
|                                   | (0.0380)       | (0.0282)       | (0.0579)       | (0.0354)       | (0.0466)      | (0.0427)      |
| São Luís                          | $-0.115^{***}$ | 0.0472         |                |                |               |               |
|                                   | (0.0361)       | (0.0321)       |                |                |               |               |
| Observations                      | 1745           | 1745           | 889            | 889            | 856           | 856           |
| Distribution by Work on Follow-up | 564            | 298            | 383            | 154            | 181           | 144           |
| Pseudo $R^2$                      | 0.158          | 0.158          | 0.147          | 0.147          | 0.146         | 0.146         |

| Table 11 – Average Mar | ginal Effect | Results: N | Not working | , Formal | and | Informal | working |
|------------------------|--------------|------------|-------------|----------|-----|----------|---------|
| after pregna           | ncy          |            |             |          |     |          |         |

Note: Distribution by work on follow-up is omitting  $Not \ Working$  values, as it is the omitted value of the

independent variable.

Standard errors in parentheses. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

|                                   | Full s          | ample         | Ribeirão Preto |               | São Luís      |               |
|-----------------------------------|-----------------|---------------|----------------|---------------|---------------|---------------|
|                                   | Formal Informal |               | Formal         | Informal      | Formal        | Informal      |
| Postpartum depression             | -0.0876**       | -0.0340       | -0.155***      | -0.00385      | 0.0268        | -0.0834*      |
|                                   | (0.0367)        | (0.0310)      | (0.0491)       | (0.0409)      | (0.0571)      | (0.0451)      |
| On daycare                        | 0.137***        | 0.0729*       | 0.175***       | 0.0528        | -0.0624       | 0.0188        |
|                                   | (0.0428)        | (0.0394)      | (0.0460)       | (0.0384)      | (0.0940)      | (0.113)       |
| Informal working                  | -0.324***       | $0.251^{***}$ | -0.273***      | $0.276^{***}$ | -0.338***     | 0.205***      |
|                                   | (0.0332)        | (0.0325)      | (0.0506)       | (0.0489)      | (0.0444)      | (0.0423)      |
| Density no. resident per room     | -0.0291         | -0.0116       | -0.0342        | -0.0226       | -0.0186       | 0.00421       |
|                                   | (0.0192)        | (0.0169)      | (0.0293)       | (0.0258)      | (0.0253)      | (0.0228)      |
| High school                       | 0.118***        | 0.00439       | $0.130^{**}$   | -0.00795      | 0.141*        | -0.0115       |
|                                   | (0.0437)        | (0.0385)      | (0.0564)       | (0.0476)      | (0.0787)      | (0.0748)      |
| Undergraduate compl./incompl.     | $0.189^{***}$   | -0.0543       | $0.155^{*}$    | -0.0565       | 0.227**       | -0.0833       |
|                                   | (0.0621)        | (0.0528)      | (0.0899)       | (0.0701)      | (0.0966)      | (0.0908)      |
| Black                             | -0.0115         | -0.0114       | -0.0154        | -0.00758      | 0.00853       | 0.00191       |
|                                   | (0.0356)        | (0.0316)      | (0.0447)       | (0.0376)      | (0.0620)      | (0.0562)      |
| Married after preg.               | -0.138***       | 0.00188       | -0.131**       | 0.00376       | -0.134***     | -0.0186       |
|                                   | (0.0391)        | (0.0336)      | (0.0555)       | (0.0475)      | (0.0539)      | (0.0482)      |
| Mother's age                      | 0.00353         | 0.00387       | -0.00250       | 0.00541       | $0.00745^{*}$ | 0.00212       |
|                                   | (0.00325)       | (0.00280)     | (0.00471)      | (0.00392)     | (0.00446)     | (0.00408)     |
| Number of children                | 0.0227          | $0.0309^{*}$  | $0.0460^{*}$   | 0.00903       | 0.00313       | $0.0537^{**}$ |
|                                   | (0.0201)        | (0.0163)      | (0.0262)       | (0.0220)      | (0.0329)      | (0.0248)      |
| Does all the housework            | -0.0152         | -0.0227       | -0.0376        | -0.0580       | -0.00915      | 0.0295        |
|                                   | (0.0311)        | (0.0270)      | (0.0443)       | (0.0369)      | (0.0434)      | (0.0396)      |
| Baby's age (months)               | 0.00634         | 0.00591       | 0.00371        | 0.00361       | 0.00904       | 0.00937       |
|                                   | (0.00603)       | (0.00522)     | (0.00746)      | (0.00604)     | (0.0111)      | (0.0102)      |
| At least one domain at risk       | $0.103^{*}$     | -0.103**      | $0.193^{***}$  | -0.200***     | 0.0566        | -0.0327       |
|                                   | (0.0563)        | (0.0419)      | (0.0731)       | (0.0399)      | (0.0802)      | (0.0683)      |
| São Luís                          | -0.0420         | 0.0398        |                |               |               |               |
|                                   | (0.0571)        | (0.0506)      |                |               |               |               |
| Observations                      | 849             | 849           | 449            | 449           | 400           | 400           |
| Distribution by Work on Follow-up | 376             | 186           | 241            | 100           | 135           | 86            |
| Pseudo $R^2$                      | 0.141           | 0.141         | 0.150          | 0.150         | 0.131         | 0.131         |

| Table 12 – | - Average Marginal Effect Results for <b>Return to Work</b> : Not working, Formal |
|------------|---|
|            | and Informal working after pregnancy  |

Note: For return to work estimation, status work during pregnancy variable did not had cases with Not working,

so the omitted variable is *Formal working during pregnancy*. Distribution by work on follow-up is omitting

 $Not\ Working$  values, as it is the omitted value of the independent variable.

Standard errors in parentheses. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

sion. This can be one of the reasons why this condition significantly affects the decision to quit formal jobs and not informal ones.

On the other hand, as one of the risk factors of postpartum depression is history of mental illness, bipolar disorder and personality factors (high neuroticism<sup>2</sup> and high introversion<sup>3</sup>) (Patel et al., 2012), it is possible that mothers with depression seek for a formal work to have access to health insurance. To put it in another way, women with history of some sort of mental illness would prefer a formal job in order to have health insurance, and there is a high chance of continuing in the formal sector. So, this combined with the higher chances of these women developing postpartum depression could explain why only the formal work after pregnancy had a significant relation with postpartum depression.

Another curious outcome is the difference between São Luís and Ribeirão Preto regarding postpartum depression results. From Table 11, we can see that in Ribeirão Preto postpartum depression had a significant and negative effect only on formally working after pregnancy, while in São Luís this result was significant only on informal work.

Lastly, comparing Table 11 and 12 we can see that the chance of not returning to a formal job after pregnancy almost doubles. One possible reason for that is the first result, which includes both working and nonworking women during pregnancy, which may be weakened by non-working women.

Now, for a deeper comprehension of the association of postpartum depression and work engagement we calculate the predicted probability to work after pregnancy according postpartum depression and according a "favorable" or "unfavorable" case. From Graphs 3 and 4, we can see that

<sup>&</sup>lt;sup>2</sup> It is sometimes defined as a tendency for quick arousal when stimulated and slow relaxation from arousal, especially with regard to negative emotional arousal. Another definition focuses on emotional instability and negativity or maladjustment, in contrast to emotional stability and positivity, or good adjustment. It has also been defined in terms of lack of self-control, poor ability to manage psychological stress, and a tendency to complain (Ormel et al., 2012).

<sup>&</sup>lt;sup>3</sup> Introversion is a personality trait and, in general, can be defined as the state of being predominantly interested in one's own mental self, focusing on internal feelings rather than on external sources of stimulation. Introverts are typically perceived as more reserved or reflective.

having postpartum depression diminishes mothers' chance to work in either formal or informal jobs after pregnancy and also diminishes their chance in both "favorable" and "unfavorable" case. This indicates that this kind of mental illness is taking women away from the labor market and, as the prevalence of postpartum depression in Brazil is about 25% (Filha et al., 2016), this could mean that, to the limit, one quarter of female work force could leave the market.

As found before, the influence of postpartum depression on mothers who were working before and are in a "good case" is bigger than comparing all mothers together (both working and not-working before birth) also in a "good case". Another difference between all the mothers (full sample) and those who was working before birth is that these last ones have bigger chances to work after birth, due to greater possibilities of working informally after pregnancy. This is explicit in the "bad case".

Putting "favorable" and "unfavorable" in contrast, we can see in both Graphs 3 and 4, that being in an "unfavorable" situation gives mothers bigger chances to not work after pregnancy. This is to be expected because the terms "favorable" and "unfavorable" themselves say that they are based on useful and convenient conditions for engaging in the labor market<sup>4</sup>.

To identify one possible channel through which depression affects labor market participation after pregnancy we interact depression with child in daycare. The idea here is that mothers may be away from work due to childcare but working was a part of their life that fulfilled their social needs. So the absence of work would help her develop postpartum depression and enrolling the child in daycare could give her the option to return to work (Gurudat, 2014). That said, we test if mothers with depression and with access to daycare centers are more engaged in labor market after pregnancy. If significant, this could imply that being away from work is associated with mothers' mental health. Although it was not significant (results in Table 12 and 13 in Appendix) this statement is reasonable only for those

<sup>&</sup>lt;sup>4</sup> Higher level of education, sharing household chores, child development is not at risk, between others.

developing depression before returning to the labor market. However, as Meltzer-Brody and Brandon, 2015 found, the prevalence of postpartum depression is almost uniformly distributed over the 18 months after birth. So, part of the women probably developed depression after returning to labor market and this statement does not fit to them.

Lastly, it is important to point out that these results may be overestimated because women in worse income situations tend to have higher levels of stress, due to economic stress, and higher levels of stress are also associated with the development of postpartum depression, which, in turn, decreases the chances of women entering or returning to the labor market, which ultimately leads to worse income situations. Thus, there is a "snowball" effect. However, these results can also be underestimated due to sample selection, in which women with depression are less likely to have children and therefore are not in the sample.

#### 4.2 Daycare Attendance

As it is popularly said, "being a mother is a full-time job". So in order to the mother go to work, the newborn needs to be cared for by someone else, and one option is daycare. The results showed us that this is a true and important aspect. If the baby is in daycare, the mother is much more likely to work after pregnancy, whether in formal (15 p.p. more likely) or informal jobs (6 p.p), according to Table 11. Curiously, daycare attendance gives twice the chance to work formally than informally and this can be explained by the fact that the informal sector allows working parttime. So, these women need to delegate childcare for less part of the time, which makes it easier and the childcare work can be allocated to family, like grandmothers and older sisters. This way, as mothers have other options to entrust childcare, the daycare continues to be important but has a smaller impact when compared to formal workers (full-time work).

It's worth noting that when the childcare is allocated to other members of the family, beyond parents, it goes to women, as are the older daughters who become responsible for this duty and not older brothers, according to the literature (Barbosa, 2014; Barbosa & Costa, 2017; Costa, 2007).

Now, comparing both cities, we can see that only in Ribeirão Preto daycare attendance was statistically significant. However, this was expected, as we saw in Table 7 a very small rate of daycare attendance in São Luís.

Curiously, when we compare all mothers and the ones who were already working during pregnancy, we can see from Tables 11 and 12 that, if she was already working, daycare attendance affected less her engagement in a formal job after pregnancy. One possible explanation is that working mothers get prepared and look out for childcare options, in order to return to work when possible, so they resort less to daycare. While not-working mothers may not prepare themselves in advance.

Again, to comprehend if daycare attendance affects women differently, we estimate the predicted probability to work after pregnancy in two situations, a "favorable" ("good") case, which means more favorable aspects to engage in the labor market like higher level of education, sharing household chores, among others. And "unfavorable" ("bad") case. We can see in both Graphs 5 and 6 that daycare attendance improves mothers' chance to work after pregnancy, whether in formal or informal jobs, going along with the literature (Barbosa & Costa, 2017; Barros et al., 2011; Connelly et al., 1996; Costa, 2007).

When we compare Graph 5, with all women, and 6, with the ones working during pregnancy, we can see that in the "good case" there is almost no difference between them. This means that "favorable" characteristics affect more mothers than work history in order to work after a pregnancy.

Now, for the "bad case", we can see much more differences, especially that daycare attendance increases the chances of working informally postbirth for those returning to work, unlike for all the mother, which increases more the possibility of working formally after pregnancy, and this is due to how we estimate this predicted probability. For returning moms, the "bad case" related to previous work is an informal work during pregnancy, for the full sample, the "bad case" can be not working during pregnancy. So, the difference in Graphs 5 and 6 points to a greater persistence to continue in informal work for returning moms.

#### 4.3 Other Aspects

As our focus in this research is to understand the importance of daycare attendance and postpartum depression on woman work engagement after pregnancy, we highlighted these in the previous subsections, but it's still worth mentioning some outcomes of our estimation.

As expected, the higher the educational level, the higher the chances of formal work. This was seen in both Tables 11 and 12, but for those already working during pregnancy, this effect was even higher. Also, this pattern effect was significantly found in returning to work mothers in both cities.

Being married affects negatively mothers' chance to work in a formal job after pregnancy, as in Tables 11 and 12. Surprisingly, it only affects formal work and not informal ones, which can be because formal work is usually a full-time job, and married women may have more interest in part-time jobs since she probably already has financial support at home.

Another interesting aspect is the housework division, which here is captured by the dummy "if the woman does all or share the housework". It was only statistically significant in Table 11 and only for formal work after pregnancy. A possible reason for that is to enter the market, when she just had a baby and when she had preferences to not work (as before she wasn't working), it may be a higher cost for these women to have a double or triple day than to women which already had preferences to work. Also, a possibility to affect only the formal workers is that they have full-time jobs and it gets even harder to dedicate time to other duties (housework) when you already work one third of the day.

Now, related to baby's development, if at least one of the five development domains (cognitive, receptive communication, expressive communication, fine motor and gross motor) is at risk, it increases mothers' chance to work formally and decreases to work informally. An explanation for that is related to having flexibility and hours spent in the labor market, which means that, since the mother has less flexibility and works full-time in a formal job, she may be spending less time with the child, and this could affect the baby development. For example, engaging in reading activities have positive child outcomes (Sénéchal & LeFevre, 2002; Zick et al., 2001). However, time is different from quality time, and some studies have found that employed mothers may compensate for the less time spent with the child by spending more time in richer activities and/or child-oriented ones in a way that children of working mothers and children from nonworking mother result have the same outcomes (Moorehouse, 1991; Zick et al., 2001). Some other explanation for the result of baby's development is that mothers with child's development at risk seek formal work to have access to health insurance and, therefore, to have access to free or cheaper treatment.





Figure 4 – Predicted Probability to **Return to Work** After Pregnancy by "Favorable" ("Good") and "Unfavorable" ("Bad") Case for Pospartum Depression



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Figure 6 – Predicted Probability to **Return to Work** After Pregnancy by "Favorable" ("Good") and "Unfavorable" ("Bad") Case for Child on Daycare



Source: Cohort Brisa 2010. Elaborated by the authors.

# 5 Conclusion

We saw that, if the child is in daycare, the mother has bigger possibilities to work after birth. This shows how important it is to guarantee womens' financial independence because, as discussed earlier, historically, women are responsible for the care of the home and the family, and access to daycare can give them time to work in the market.

This was already recorded in the literature (Barbosa & Costa, 2017; Barros et al., 2011; Connelly et al., 1996; Costa, 2007) but, especially in the study of Barros et al., 2011 they saw the impact of free child care almost doubled the employment of women who were not working before. We have also notice this importance when comparing daycare attendance for women in different contexts (a "favorable" and an "unfavorable" one) and we found that daycare child attendance for mothers in an unfavorable situation increases meaningfully mothers' chance to be in the labor market.

Motherhood is a romanticized period in which women can only feel joy and gratitude, and have to support all the work involving a newborn, but this is not the reality. This disparity between the ideal and the real, added to the lack of social support, can cause women to develop symptoms of postpartum depression. We have seen that this affects working after birth, especially in the formal sector, and this may be due to the lack of flexibility that formal jobs have.

Another issue related to postpartum depression that is worth mentioning is its impact on childcare. In the study of Field, 2010, that reviews the literature about the subject across countries, she finds that this impact is universal, across different cultures and socioeconomic status groups. In early interaction, depressed mothers have an intrusive, controlling and over-stimulating style of interaction, also they touch their children less frequently, less affectionately, and more negatively (e.g. rough pulling, tickling and poking). Further several care giving activities also appear to be compromised by postpartum depression effects on the developing parenting roles including feeding practices, most especially breastfeeding, sleep routines and well-child visits and vaccinations.

To give women more opportunities to work after pregnancy, some public and private policies can be done. For public policies, women must have access to daycare and, for the poor ones, it is important to be a free service. This can be done by opening more free daycare centers throughout the city and/or having a voucher system with a percentage or a full discount.

Another public policy is to offer in the public health system psychological support from prenatal care until the puerperium and also provide psychological and drug treatment, when needed, for mothers diagnosed with postpartum depression. However, it is mandatory to do this with support and understanding, so that does not reinforce prejudice against this condition.

Private policies are also important and, in the scope of companies, they can offer daycare at work, daycare tickets, and/or some space so the child can be watched and the mother can work. The latter does not cancel the daycare at work or the daycare ticket, but makes it possible for women to work when unexpected events happen.

Related to postpartum depression, private policies are crucial too. Companies can be more understanding of mothers' new needs, like breastfeeding, and unexpected baby emergencies, and also comprehend that they may be in sleep deprivation. So, in sum, companies need to realize that when mothers return, they have a new reality. In face of that, companies can create an specific space for breastfeeding, and can also provide local psychological support for recent mothers, among other possibilities of support.

Still, it is possible to have an interaction with private and public policies, for example, the government can make daycare tickets and breastfeeding spaces mandatory, can offer tax discounts for companies with local psychological support and/or for those with space for children.

It is worth mentioning that these policies not only make the workplace fairer and more welcoming to women but also avoid or decrease public and private costs, once the low productivity and absenteeism infer a private cost for the companies, as well as the dismissal and replacement of the mother. In the public sphere, mothers who were unable to re-enter the market can use the unemployment insurance benefit.

Last but not least, it is the difference between women and men in both labor market and at home. In the labor market, women are historically earning less than men and, despite the reduction of this disparity (IBGE, 2010; Madalozzo & Martins, 2007; Yahmed, 2018), it still exists, which can be preventing women from having their place in the market, especially new mothers. If women's wages had increased (reduction of wage gap) it could make mothers return to work or even enter the labor market, due to becoming higher than their reservation wage. Also, historically, women are responsible for housework and childcare and this workload can be moving them away from the market. Again, despite the increase in men's participation in these responsibilities, women still are mainly in charge (Barbosa, 2018). If men step in more and ease mothers' duties, they can reduce their reservation wage, allowing them to return to or enter the market. So, beyond daycare attendance and postpartum depression, we still have to account for the gender gap to make a more homogeneous and egalitarian labor market.

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# APPENDIX A -

|   | Full sample     |               | Ribeirão Preto |                | São Luís  |                |
|---|-----------------|---------------|----------------|----------------|-----------|----------------|
|   | Formal Informal |               | Formal         | Informal       | Formal    | Informal       |
| Formal working                            | 1.698***        | 0.708***      | 1.410***       | 0.763***       | 2.153***  | 0.520*         |
|   | (0.146)         | (0.188)       | (0.194)        | (0.256)        | (0.233)   | (0.292)        |
| Informal working                          | $0.560^{***}$   | $1.513^{***}$ | 0.781***       | 1.811***       | 0.593**   | 1.330***       |
|   | (0.192)         | (0.176)       | (0.291)        | (0.297)        | (0.284)   | (0.225)        |
| Density no. resident per room             | -0.138*         | -0.0478       | -0.223**       | -0.218         | -0.0793   | 0.0884         |
|   | (0.0743)        | (0.0830)      | (0.102)        | (0.133)        | (0.116)   | (0.104)        |
| High school                               | $0.339^{*}$     | -0.0993       | 0.327          | -0.0777        | 0.484     | -0.0794        |
|   | (0.177)         | (0.188)       | (0.207)        | (0.250)        | (0.386)   | (0.296)        |
| Undergraduate compl./incompl.             | $0.639^{**}$    | -0.281        | 0.154          | -0.556         | 0.961**   | -0.207         |
|   | (0.276)         | (0.336)       | (0.402)        | (0.509)        | (0.469)   | (0.473)        |
| Black                                     | 0.0748          | -0.0933       | -0.0122        | -0.211         | 0.161     | 0.115          |
|   | (0.141)         | (0.165)       | (0.169)        | (0.215)        | (0.275)   | (0.280)        |
| Married after preg.                       | -0.861***       | $-0.356^{*}$  | -0.693***      | -0.241         | -1.065*** | $-0.462^{*}$   |
|   | (0.158)         | (0.189)       | (0.225)        | (0.295)        | (0.235)   | (0.250)        |
| Mother's age                              | -0.000709       | $0.0313^{**}$ | -0.0233        | 0.0315         | 0.0279    | 0.0223         |
|   | (0.0131)        | (0.0146)      | (0.0178)       | (0.0214)       | (0.0206)  | (0.0207)       |
| Number of children                        | 0.0521          | 0.119         | 0.159          | 0.117          | -0.0388   | 0.148          |
|   | (0.0841)        | (0.0889)      | (0.108)        | (0.131)        | (0.148)   | (0.123)        |
| Does all the housework                    | -0.346***       | $-0.297^{**}$ | -0.599***      | $-0.554^{***}$ | -0.117    | -0.0275        |
|   | (0.126)         | (0.145)       | (0.170)        | (0.213)        | (0.201)   | (0.204)        |
| Postpartum depression                     | $-0.419^{**}$   | $-0.361^{*}$  | -0.369         | -0.230         | -0.422    | $-0.504^{*}$   |
|   | (0.179)         | (0.203)       | (0.253)        | (0.323)        | (0.261)   | (0.267)        |
| Baby's age (months)                       | 0.0330          | $0.0456^{*}$  | 0.00981        | 0.00975        | 0.0701    | $0.112^{**}$   |
|   | (0.0234)        | (0.0273)      | (0.0270)       | (0.0336)       | (0.0489)  | (0.0468)       |
| On daycare                                | $1.157^{***}$   | $1.005^{***}$ | 1.374***       | $1.136^{***}$  | -0.733    | 0.488          |
|   | (0.196)         | (0.233)       | (0.210)        | (0.264)        | (0.907)   | (0.606)        |
| At least one domain at risk               | -0.00365        | $-0.564^{*}$  | 0.0197         | $-1.013^{*}$   | -0.133    | -0.308         |
|   | (0.229)         | (0.307)       | (0.303)        | (0.518)        | (0.374)   | (0.391)        |
| São Luís                                  | $-0.618^{***}$  | 0.107         |                |                |           |                |
|   | (0.216)         | (0.255)       |                |                |           |                |
| On daycare $\times$ Postpartum depression | 0.00264         | -0.146        | -0.157         | -0.318         | 1.667     | -11.05         |
|   | (0.321)         | (0.384)       | (0.370)        | (0.467)        | (2.148)   | (504.2)        |
| Constant                                  | -0.936          | -3.008***     | 0.288          | $-1.907^{*}$   | -3.298*** | $-4.149^{***}$ |
|   | (0.678)         | (0.793)       | (0.835)        | (1.070)        | (1.080)   | (1.028)        |
| Observations                              | 1745            | 1745          | 889            | 889            | 856       | 856            |
| Distribution by Work on Follow-up         | 564             | 298           | 383            | 154            | 181       | 144            |
| Pseudo $R^2$                              | 0.158           | 0.158         | 0.145          | 0.145          | 0.146     | 0.146          |

Table 13 – Multinomial Results: Not working, Formal and Informal working after pregnancy

Note: Distribution by work on follow-up is ommiting Not Working values, as it is the ommited value of the

independent variable.

Standard errors in parentheses. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

|   | Full sample     |                | Ribeirão Preto |               | São Luís     |              |
|---|-----------------|----------------|----------------|---------------|--------------|--------------|
|   | Formal Informal |                | Formal         | Informal      | Formal       | Informal     |
| Informal working                          | $-1.175^{***}$  | 0.820***       | -0.613**       | 1.096***      | -1.557***    | 0.737**      |
|   | (0.199)         | (0.210)        | (0.310)        | (0.325)       | (0.283)      | (0.300)      |
| Density no. resident per room             | -0.222**        | -0.192         | -0.361**       | $-0.402^{**}$ | -0.106       | -0.00682     |
|   | (0.105)         | (0.122)        | (0.160)        | (0.199)       | (0.148)      | (0.161)      |
| High school                               | $0.758^{***}$   | 0.393          | $0.867^{***}$  | 0.525         | 0.924        | 0.180        |
|   | (0.269)         | (0.288)        | (0.335)        | (0.384)       | (0.586)      | (0.480)      |
| Undergraduate compl./incompl.             | $0.997^{***}$   | 0.103          | 0.789          | 0.119         | $1.272^{*}$  | -0.227       |
|   | (0.364)         | (0.441)        | (0.544)        | (0.651)       | (0.653)      | (0.671)      |
| Black                                     | -0.110          | -0.133         | -0.149         | -0.154        | 0.0564       | 0.0315       |
|   | (0.204)         | (0.238)        | (0.264)        | (0.313)       | (0.362)      | (0.397)      |
| Married after preg.                       | $-0.894^{***}$  | $-0.494^{*}$   | -0.926**       | -0.616        | -0.865***    | -0.413       |
|   | (0.229)         | (0.265)        | (0.368)        | (0.434)       | (0.311)      | (0.349)      |
| Mother's age                              | $0.0349^{*}$    | $0.0439^{**}$  | 0.00899        | 0.0426        | $0.0501^{*}$ | 0.0310       |
|   | (0.0185)        | (0.0213)       | (0.0281)       | (0.0330)      | (0.0267)     | (0.0293)     |
| Number of children                        | $0.245^{**}$    | 0.333***       | $0.378^{**}$   | $0.322^{*}$   | 0.129        | $0.405^{**}$ |
|   | (0.118)         | (0.128)        | (0.159)        | (0.187)       | (0.197)      | (0.183)      |
| Does all the housework                    | -0.170          | -0.239         | -0.556**       | -0.773**      | 0.00403      | 0.200        |
|   | (0.174)         | (0.201)        | (0.262)        | (0.310)       | (0.254)      | (0.281)      |
| Postpartum depression                     | -0.500**        | $-0.567^{*}$   | -0.828**       | -0.613        | -0.136       | -0.618       |
|   | (0.244)         | (0.296)        | (0.370)        | (0.475)       | (0.333)      | (0.394)      |
| Baby's age (months)                       | $0.0593^{*}$    | $0.0702^{*}$   | 0.0449         | 0.0553        | 0.0747       | 0.0881       |
|   | (0.0359)        | (0.0412)       | (0.0456)       | (0.0522)      | (0.0667)     | (0.0739)     |
| On daycare                                | $1.304^{***}$   | $1.174^{***}$  | $1.665^{***}$  | $1.511^{***}$ | -1.564       | -0.00801     |
|   | (0.297)         | (0.338)        | (0.351)        | (0.409)       | (1.195)      | (0.768)      |
| At least one domain at risk               | 0.288           | -0.664         | 0.353          | $-2.041^{*}$  | 0.272        | -0.137       |
|   | (0.304)         | (0.440)        | (0.448)        | (1.085)       | (0.451)      | (0.536)      |
| São Luís                                  | -0.131          | 0.194          |                |               |              |              |
|   | (0.316)         | (0.377)        |                |               |              |              |
| On daycare $\times$ Postpartum depression | -0.551          | -0.136         | -0.538         | -0.349        | 13.72        | 0.888        |
|   | (0.463)         | (0.530)        | (0.561)        | (0.671)       | (637.5)      | (1119.1)     |
| Constant                                  | -1.474          | $-3.581^{***}$ | -0.295         | -2.584        | -2.689*      | -3.988**     |
|   | (1.036)         | (1.202)        | (1.458)        | (1.744)       | (1.486)      | (1.561)      |
| Observations                              | 849             | 849            | 449            | 449           | 400          | 400          |
| Distribution by Work on Follow-up         | 376             | 186            | 241            | 100           | 135          | 86           |
| Pseudo $R^2$                              | 0.141           | 0.141          | 0.149          | 0.149         | 0.131        | 0.131        |

Table 14 – Multinomial Results for **Return to Work**: Not working, Formal and Informal working after pregnancy

Note: For return to work estimation, status work during pregnancy variable did not had cases with Not working,

so the ommited variable is *Formal working during pregnancy*. Distribution by work on follow-up is ommiting

Not Working values, as it is the ommitted value of the independent variable.

Standard errors in parentheses. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01





Figure 8 – Predicted Probability to Work After Pregnancy by "Good" and "Bad" Case for Child on Daycare in **Ribeirão Preto** 



Source: Cohort Brisa 2010. Elaborated by the authors.





Figure 10 – Predicted Probability to **Return to Work** After Pregnancy by "Good" and "Bad" Case for Child on Daycare in **Ribeirão Preto** 



Source: Cohort Brisa 2010. Elaborated by the authors.





Figure 12 – Predicted Probability to Work After Pregnancy by "Good" and "Bad" Case for Child on Daycare in **São Luís** 









Figure 14 – Predicted Probability to **Return to Work** After Pregnancy by "Good" and "Bad" Case for Child on Daycare in **São Luís** 



Source: Cohort Brisa 2010. Elaborated by the authors.