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The Role of Urban Care Sector in Women's Employment and Gender Segregation in Colombian Regions

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Abstract:

The provision of care services can reduce gender labor gaps. As care-related economic activities are highly feminized, strengthening care services can increase women's share of total employment. Care services can also reduce the unpaid care burden and promote women's employment in other sectors, which could change sectoral gender segregation. We explore these relationships for Colombia through a regional urban analysis. We classify cities into three regions using their level of competitiveness as a broad measure of labor market dynamics. Using a fixed effects model, our results show that an increase in the importance of the care sector boosts women's labor force participation and sectoral segregation; however, we emphasize the importance of urban and regional contexts in determining the role of care provision on gender equality.

Keywords: Care provision; segregation; employment.
JEL Classification: R20; J16.

El papel del sector de cuidados urbanos en el empleo femenino y la segregación de género en las regiones de Colombia

Resumen:

La provisión de servicios de cuidado puede reducir las brechas laborales de género. Dado que las actividades económicas relacionadas con el cuidado están altamente feminizadas, fortalecer los servicios de cuidado puede aumentar la participación de las mujeres en el empleo total. Los servicios de cuidado también pueden reducir la carga del cuidado no remunerado y promover el empleo femenino en otros sectores, lo que podría cambiar la segregación sectorial por género. Exploramos estas relaciones para Colombia a través de un análisis regional urbano. Clasificamos las ciudades en tres regiones utilizando su nivel de competitividad como una medida amplia de la dinámica del mercado laboral. Utilizando un modelo de efectos fijos, nuestros resultados muestran que un aumento en la importancia del sector de cuidados impulsa la participación laboral femenina y la segregación sectorial; sin embargo, enfatizamos la importancia de los contextos urbanos y regionales en la determinación del papel de la provisión de cuidados en la igualdad de género.

Palabras clave: Provisión de cuidados; segregación; empleo.
Clasificación JEL: R20; J16.

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1. Introduction

One of the primary reasons for the stagnation in closing gender gaps in employment and wages is the persistent imbalance in unpaid work between genders (OECD, 2014). The unavailability of accessible social care services significantly limits women's participation in the labor market. Ensuring the provision of care services can alleviate the domestic responsibilities that predominantly fall on women.

In this study, we analyze how the expansion of care services can lead to increased female employment in a developing country, using Colombia as a case study. Colombia is characterized by significant levels of inequality and persistent regional disparities (Aristizábal & García, 2021). The country also displays substantial heterogeneity in economic and social indicators between regions. Differences in productive structures, population, and cultural characteristics of cities can differentially impact on employment and gender gaps. The contribution of this study is to explore the differential effects of expanding care services on female employment and segregation indexes across regions with varying levels of development within the country.

Colombia is a country with wide labor gender gaps which have been persistent over time. Between 2010 and 2019, women's labor force participation rate averaged 54%, 21 percentage points lower than men's (75%). This gap remained almost unchanged as it fell less than two percentage points during this period. Likewise, women's unemployment rate has been historically higher than men's. Women's unemployment rate was close to 13% between 2010 and 2019, while men's was around 7.5%.

Although women in Colombia account for slightly more than 50% of the working-age population, they represent a much smaller percentage of the labor force and the employed. In 2008, women represented 39% of the employed. Ten years later, in 2018, women made up 41.5% of the employed.

This paper analyzes whether strengthening paid care provision leads to an increase in the share of women in total employment (leading to a reduction in labor gender gaps) and whether it also modifies sectoral segregation through spillover effects of care provision. These effects can happen when decreasing the burden of unpaid care could reduce women's work restrictions and allow them to access jobs performed mostly by men, thus potentially increasing women's participation in masculinized sectors. According to our econometric analysis of 23 cities in Colombia, an increase in the weight of the care sector in total employment boosts women's representation in employment and job segregation by gender. This suggests that we find no econometric evidence that an increase in the importance of the care sector promotes the inclusion of women in traditionally male sectors. However, some heterogeneous results were found across regions. In the highly competitive Central region, the expansion of care services is linked to an increase in the female share of employment. Conversely, in the Peripheral region, characterized by a less competitive environment and a low share of female employment, the growth of the care sector also boosted female employment and was positively associated with segregation.

The paper is structured as follows. Section 2 presents a literature review, discussion and theoretical framework on the role of care provision for gender equality and gender segregation in labor markets. Section 3 provides an overview of the data and some initial descriptive analysis. Section 4 presents the methodology and regression results. Finally, section 5 concludes the paper.

2. Discussion and literature

Literature explores the effects of public or subsidized child care services on maternal employment. The results of this literature suggest positive effects on labor market participation ranging from small (Asai, 2015; Givord & Marbot, 2015; Nollenberger & Rodríguez-Planas, 2015) to large (Carta & Rizzica, 2018; Geyer et al., 2015; Haeck et al., 2015). Some studies only find effects for specific groups of women, such as single mothers (Cascio, 2009; Fitzpatrick, 2012; Goux & Maurin, 2010), women of intermediate educational level (Müller & Wrohlich, 2020) or married women (Baker et al., 2008; Barua, 2014). Other articles find no significant positive effects on mothers' employment (Fitzpatrick, 2010; Havnes & Mogstad, 2011; Lundin et al., 2008).

Some studies acknowledge that context can amplify or moderate the effect of care-oriented policies (Cascio et al., 2015). For example, if female labor participation and the supply of early childhood care services are already high, the effects of public or subsidized childcare services on maternal employment could be low at the margin. Meanwhile, with more profound gender gaps in labor participation and insufficient public childcare provision, the effects of expanding childcare services may be larger. Other factors such as social norms, labor market discrimination against women, lack of public policies such as leave policies, and total household income -among others- can mitigate the impact of free childcare services (Cascio et al., 2015). Also, these policies can substitute informal care for formal care provided by the government, especially for mothers already working (Givord & Marbot, 2015).

Another strand of literature examines care and social infrastructure, encompassing various care services for children, elderly, disabled, and sick individuals. Antonopoulos et al. (2010) find that investing in social infrastructure is more cost-effective for job creation, particularly for women, than investing in construction. Their study reveals that social care investment benefits low-income households and low-skilled workers. Ilkkaracan et al. (2015) simulate the impact of expanding childcare coverage in Turkey to OECD average levels, showing that this policy generates 2.5 times more jobs than investing in construction. Notably, 73% of the new jobs are held by women, with over half engaged in domestic work.

Ilkkaracan et al. (2021) examine the impact of expanding public spending on early childhood care and education in Turkey. They find these policies significantly increase women's employment and reduce women's time poverty. Oyvat & Onaran (2022) study the expansion of social infrastructure in South Korea and discover that it generates more employment opportunities for women and can lead to an increase in the share of female employment. The results of both studies highlight the gendered nature of the care sector, where increased public investment leads to a substantial rise in women's employment. However, men tend to benefit more from indirect jobs. These effects are analyzed through backward linkages of intermediate inputs in an input-output matrix.

Although women have increased their labor participation and women's share of employment has risen in many countries, job segregation has worsened (Seguino & Braunstein, 2019). Globally, women tend to be more concentrated in education, health and social work sectors, followed by wholesale and retail. Meanwhile, men are highly segregated in construction, transportation, storage, communication, public administration, and defense (including the armed forces) (ILO, 2017). Studying developing countries, Borrowman & Klasen (2020) find that a high share of commerce and services is associated with lower overall segregation. However, their analyses use the percentage of service employment, a broad classification that includes all service workers, including care activities.

While expanding care services can increase women's participation and employability, it is unclear whether this policy strategy relegates women to low-paid care work. Care workers are often underpaid, overworked, and have poor working conditions (Budig & Misra, 2010; England et al., 2002; Folbre, 2006; Folbre, 2018; ILO, 2018; Peng, 2010; Esquivel, 2010; Quevedo Rocha et al., 2021). Most existing literature does not analyze whether expanding care services leads to more or less gender sectoral segregation.

The effect of expanding care services on sectoral gender segregation has been considered in theoretical and macroeconometric models that suggest that an increase in investment in care can lead to changes in segregation in the care sector and in the rest of the economy (Onaran et al., 2022; Oyvat & Onaran, 2022). However, the direction of the effects has not been clearly determined. Onaran et al. (2022) mention the possible effect but leave it out of the analysis. Oyvat & Onaran (2022) include occupational segregation endogenously in the model, although they do not emphasize the results.

Gender segregation in the labor market is rooted in the assignment of women to domestic work and men to market work (Kreimer, 2004). Women's care responsibilities limit their participation in the labor market by restricting them to jobs that have certain characteristics: they are part-time, flexible, and do not require constant availability (Kreimer, 2004). This segregates women into certain occupations and positions within economic activities. An increase in spending on care services can therefore reduce gender segregation if the reduction in unpaid care burdens allows women to enter the labor force in non-feminized sectors and/or induce women to move to jobs previously held only by men because of the care constraints that limited women.

Previous studies have examined gender gaps in different countries analyzing regional heterogeneity. Huertas et al. (2017) study gender gaps in Spain, Fuchs et al. (2021) focused on Germany, and Duque et al. (2016) studied Colombia. In Colombia, Duque et al. (2016) found significant gender unemployment gaps across regions, with variations ranging from 8 percentage points in the Caribbean region to 3.6 percentage points in Bogotá. They also observed a negative relationship between local unemployment, gender gaps and competitiveness, although this association weakened when accounting for differences in characteristics between men and women. The authors concluded that competitiveness can impact gender gaps through worker sorting effects and differential labor market outcomes for men and women. In Germany, Fuchs et al. (2021), find that regional and individual factors explained only a small portion of the gender pay gap, while disparities in firm-specific characteristics across regions played a substantial role in shaping regional differences and local employment opportunities, contributing to closing gender gap.

In this study, our goal is to contribute to research on the determinants of women's employment by examining the relationship between enhanced care services and women's employment and job segregation. Additionally, we approach our analysis by recognizing the interconnectedness between regional heterogeneity and labor market outcomes.

3. Data and descriptive analysis

We use Colombia's main cross-section household survey, Gran Encuesta Integrada de Hogares (GEIH), provided by the Colombian National Statistics Department (DANE)[1]. The survey is representative at the national level, as well as for 16 cities and 7 metropolitan areas (MA). A wide range of labor indicators, including labor supply, informality, and wages, are available within a gender-differentiated framework. This data also allows for disaggregated information by age, marital status, and educational attainment and provides employment information by sector at a very disaggregated level, following the International Standard Industrial Classification of all Economic Activities (ISIC).

When analyzing gaps among spatial units, such as cities or countries, it is common to group them into regions. This approach enhances the analysis, improves feasibility, and facilitates result interpretation. Analyzing Colombian data, Duque et al. (2016) employed a competitiveness index to construct macroregions, capturing labor demand factors such as productive structures, efficiency, education, sophistication, and innovation. Higher competitiveness indexes correlate with more dynamic labor markets. The study revealed that lower-competitiveness cities and regions exhibited larger unemployment gender gaps. This exogenous methodology ensures homogeneity in socio-economic characteristics within each macroregion, minimizes information loss through aggregation, and aims to maximize heterogeneity between regions.

We group cities following Duque et al. (2016). We group the 23 cities in our sample in three broad macroregions, the first, is the Central macroregion, the most competitive, industrialized, and dynamic region. This region is followed by the Caribbean-northeastern macroregion with lower competitiveness yet highly industrialized, and finally the Peripheral region, the least competitive of the three [2].

[1] The survey's data collection began in 2006; however, this year marked a transition to the implementation of a new questionnaire, and 2007 was a year of stabilization in the operational learning process of the survey's methodology (Farné, 2010). According to experts, these two years present a series of limitations. Thus our 10-year period of analysis begins in 2008 and ends in 2018. Additionally, we utilized the expansion factor from the 2005 Census and applied it to all the years we analyzed. Despite the introduction of newer adjustment frameworks in the 2018 Census, our focus on the 2008-2018 period demanded a consistent methodology to ensure comparability throughout the entire timeframe. Furthermore, the absence of the expansion factor from the 2018 Census for years preceding 2010 strengthens our reliance on the 2005 Census data for the specified period.

[2] Duque et al. (2016) classify Bogota as a separate region because of its high levels of competitiveness. We deviate from their approach by including Bogota in the Central region, the region with the highest competitiveness. The Central region includes Bogota and other large cities, such as Bucaramanga MA, Cali MA, Manizales MA, Medellín MA, Pereira MA, and Tunja. This simplifies the analysis with a smaller number of regions, while being consistent with grouping strategy. The Caribbean-northeastern macroregion is made of Cartagena, Cúcuta MA, Barranquilla MA, Montería, Riohacha, Santa Marta, Sincelejo, and Valledupar. An additional variation is that while Duque et al. exclude Florencia and Quibdó from the analysis due to lack of data, we include these cities in the Peripheral region, given their low competitiveness and geographic location. The Peripheral region groups the cities of Florencia, Ibagué, Armenia, Neiva, Pasto, Popayán, Quibdó, Villavicencio.

We also grouped sectors according to their level of feminization in 2008. Highly feminized sectors have a female share of employment above 50%, defeminized sectors have a share between 20% and 50%, and highly defeminized have a percentage below 20%. We analyze the paid care sector separately, as it is the most feminized, with an average female share of 75% for all cities in 2008. This sector includes education, health, and domestic service activities.

Table 1 presents a description of sectoral employment for each region. All regions have a similar percentage of jobs in paid care activities and feminized sectors. The central region has more jobs in defeminized sectors, 19.29% in manufacturing and 7.67% in professional, scientific, and technical activities, and administrative services. The Caribbean-NE region has the highest share of employment in highly defeminized sectors. This difference in the distribution of workers across economic sectors is essential for our analysis. Improvements in care service provision can generate more female employment in industries other than care, particularly in denser labor markets, and if the productive structure is not concentrated in a few sectors. In dense, diverse, and more competitive markets, better matches between workers and firms occur, increasing productivity and wages (Glaeser & Maré, 2001). For example, Almeida et al. (2022) found that women benefit more from agglomeration economies in Brazil, but working in an occupation with a female majority in denser metropolitan areas negatively affects women's wages.

The figures in Table 1 reveal interesting gender differences comparing 2008 with 2018[3]. The Central and Peripheral regions displayed a similar share of women in total employment, 45% in 2008. However, while the Caribbean-NE region had the lowest proportion of female employment in 2008 (40.5%), it presented the most substantial increase in female employment during the decade, registering a 41.9% growth and a fall in the segregation index from 35% to 33% lead by higher employment growth for women than men in masculinized sectors. Also, the Caribbean registered the most substantial employment growth in the paid care sector.

[3] Although the GEIH has more recent data available, we utilize the 2008 and 2018 datasets due to our reliance on the ISIC Revision 3 classification for economic activities. Starting from in 2020, the GEIH incorporates the ISIC Revision 4 classification. However, the Revision 4 correlation is only accessible from 2015 onwards. Utilizing this classification would mean lacking activity classification data for years before 2015, limiting our analysis to a few years. Moreover, in 2020, the pandemic disproportionately impacted female employment, leading to women exiting the labor force as domestic responsibilities surged due to closures of schools, nurseries, and eldercare facilities closures for isolation purposes (Tribin et al. 2023). Additionally, for population data, we rely on the latest census, which was conducted in 2018.

TABLE 1.
Employment and segregation statistics by sector groupings according to regions

Sector grouping	Employment 2008 (in thousands)			Share 2008 (%)			Percentage change in employment (2008 vs. 2018) %			Segregation* (share W-M) p.p.	
	W.	M.	Tt.	W.	M.	Tt.	W.	M.	Tt	2008	2018
Panel A. Peripheral region											
Paid care	100	36	136	23.9	7.1	14.7	16.6	24.8	18.8	16.8	15.1
Feminized	94	56	149	22.3	11.0	16.1	28.9	40.4	33.2	11.3	10.6
Defeminized	215	271	486	51.2	53.6	52.5	25.6	17.3	20.9	-2.3	1.0
Highly defeminized	11	143	154	2.6	28.3	16.6	71.9	33.4	36.0	-25.8	-26.7
Total peripheral region	**419**	**506**	**925**	**100**	**100**	**100**	**25.4**	**24.9**	**25.1**	**29.8**	**31.2**
Panel B. Caribbean-northeastern region											
Paid care	203	58	260	27.5	5.3	14.3	27.8	37.4	29.9	22.2	19.0
Feminized	170	114	284	23.1	10.6	15.6	44.0	54.8	48.4	12.5	10.6
Defeminized	347	584	931	47.1	54.0	51.2	48.4	18.3	29.5	-6.9	-0.7
Highly defeminized	17	326	343	2.3	30.1	18.9	58.9	34.1	35.3	-27.8	-29.0
Total caribbean-northeastern region	**737**	**1082**	**1819**	**100**	**100**	**100**	**41.9**	**27.9**	**33.6**	**35.0**	**32.8**
Panel C. Central region											
Paid care	704	215	919	23.1	5.9	13.7	21.9	20.8	21.6	17.2	16.4
Feminized	600	437	1037	19.7	11.9	15.5	33.3	37.1	34.9	7.8	7.4
Defeminized	1632	2164	3796	53.6	59.2	56.7	24.4	17.3	20.3	-5.6	-3.9
Highly defeminized	107	841	949	3.5	23.0	14.2	60.0	30.6	33.9	-19.5	-20.0
Total central region	**3044**	**3657**	**6701**	**100**	**100**	**100**	**26.8**	**22.9**	**24.7**	**26.4**	**28.3**

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TABLE 1. CONT.
Employment and segregation statistics by sector groupings according to regions

Sector grouping	Employment 2008 (in thousands)			Share 2008 (%)			Percentage change in employment (2008 vs. 2018) %			Segregation* (share W-M) p.p.	
	W.	M.	Tt.	W.	M.	Tt.	W.	M.	Tt	2008	2018
Panel D. Total 23 cities											
Paid care	1007	309	1315	24.0	5.9	13.9	22.5	24.4	23.0	18.1	16.8
Feminized	864	607	1470	20.6	11.6	15.6	35.0	40.7	37.3	9.0	8.4
Defeminized	2193	3019	5213	52.2	57.6	55.2	28.3	17.5	22.0	-5.3	-2.7
Highly defeminized	135	1310	1445	3.2	25.0	15.3	60.8	31.8	34.5	-21.8	-22.5
Total 23 cities	**4199**	**5245**	**9444**	**100**	**100**	**100**	**29.3**	**24.1**	**26.5**	**28.2**	**29.2**

Note: W. means Women, M. means Men and Tt. means total. Segregation: difference between the percentage of employed women working in sector i and the percentage of employed men working in sector i. The segregation in the total row corresponds to the Duncan index of dissimilarity: $\frac{1}{2}\sum_i \left|\frac{M_i}{M} - \frac{F_i}{F}\right|$ where Mi and Fi are the numbers of males and females working in sector i and M and F are the total number of men and women employed (Borrowman & Klasen, 2020). Feminized sectors include Accommodation and food services; Information and communication activities; Financial and insurance activities; Arts, entertainment, recreation and other service activities. Defeminized sectors include Manufacturing; Electricity, gas, water and waste management supply; Trade and repair of vehicles; Real estate activities; Professional, scientific and technical activities and administrative services; Public administration and defense. Highly defeminized sectors include Agriculture, hunting, hunting, forestry and fishing; Mining and quarrying; Construction; Transportation and warehousing.
Source: GEIH, DANE. Own elaboration.

4. Methodology and Results

Two processes can emerge with an expanding care sector. Given the high degree of segregation in the care sector, where women account for more than 75% of the workforce, an increase in the demand for care will lead to a higher increase in the number of female jobs in this sector and, all else being equal, to an increase in the share of women in total employment.

A second effect arises from the potential externalities or spillovers of expanding the care sector into other sectors. For example, more care services could allow women to participate and compete for jobs dominated by men if the care burden decreases. If this happens, women could increase their participation in traditionally masculinized sectors. To explore these effects we estimated the following econometric models.

4.1. Empirical model

To analyze the drivers of female employment share and segregation, we estimated the following model using panel data for the 23 main Colombian cities over 11 years (2008-2018) with city and quarter-year fixed effects, following Borrowman & Klasen (2020):

$$\begin{aligned} ln\,(y_{itq}) = \alpha_i &+ \beta_1 ln(wage\ ratio_{itq}) + \beta_2 ln(male\ unpaid\ care_{itq}) \\ &+ \beta_3 ln(female\ unpaid\ care_{itq}) + \beta_4 ln(educ.ratio_{itq}) \\ &+ \beta_5 ln(male\ educ._{itq}) + \beta_6 ln(care\ share_{itq}) + \beta_7 ln(agric.share_{itq}) \\ &+ \beta_8 ln(manuf.share_{itq}) + \beta_9 ln(commerce\ share_{itq}) \\ &+ \beta_{10} ln(mining\ \&\ const.share_{itq}) + \beta_{11} ln(services\ share_{itq}) \\ &+ \beta_{12} ln(other\ share_{itq}) + i_i + tq_{tq} + \varepsilon_{it} \end{aligned} \quad (1)$$

We estimate two models: (i) the first model uses y_{itq} as the outcome variable measuring female employment as a percentage of total employed for city *i* at year *t* and quarter *q*, and (ii) a second model where y_{itq} is the outcome variable sector segregation index[4] (Duncan index of dissimilarity).

As explanatory variables we use the wage ratio, which is the male/female ratio of the average monthly[5] labor income of employed population in city *i* at year *t* and quarter *q*; male unpaid care, measuring the average number of hours per week of unpaid domestic and care work by employed men in city *i* at year *t* and quarter *q*; female unpaid care, which is the average number of hours per week of unpaid domestic and care work by employed women in city *i* at year *t* and quarter *q*; education ratio is the female/male ratio of the average number of years of schooling of employed population in city *i* at year *t* and quarter *q*; male education is the average number of years of schooling of man employed in city *i* at year *t* and quarter *q*; finally care[6], agriculture, manufacture, commerce, mining & construction, services[7], and other[8] shares are the employment of each sector as a percentage of total employment. We used the natural logs of the

[4] The segregation index was built with the classification of 15 sectors.

[5] It's important to note that while the survey utilized in our study is representative at the quarter and year level, individuals' reported incomes are collected on a monthly basis. This implies that respondents are requested to provide their income data for the month in which they are interviewed. However, given that the survey is conducted cross-sectionally, different individuals are interviewed each month. Consequently, when constructing the panel dataset on a yearly basis, we utilize the monthly income variable of each respondent within the city and calculate the average income for the entire year.

[6] The care paid sector includes education, health, and domestic service activities. Specifically, it includes the following 2-digit ISIC Revision 3 codes: 80, 85, and 95.

[7] The services sector includes Transportation and warehousing, Accommodation and food services, Information and communications, Financial and insurance activities, Real estate activities, Professional, scientific and technical activities and administrative services, Public administration and defense, Arts, entertainment, recreation, leisure and other service activities. Specifically, it includes the following 2-digit ISIC Revision 3 codes: 60, 61, 62, 63, 72, 55, 64, 65, 66, 67, 70, 71, 73, 74, 75, 91, 92, 93, 99.

[8] Other includes Electricity, gas, water, and waste management supply (40, 41 and 90 codes 2-digit ISIC Revision 3) and observations with the sector not reported.

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variables following Borrowman & Klasen (2020). The segregation regression includes female labor force participation rate as a percentage of the total labor force participation rate as an independent variable.

This regression analysis is exploratory in nature and should be approached with caution as it does not establish a causal relationship. However, based on previous findings by Borrowman & Klasen (2020) and the model proposed by Oyvat & Onaran (2022), one can anticipate certain directional relationships among the variables used. For instance, in the first model, a positive relationship is expected between the female employment share of total employment and male's unpaid care, the education ratio, and the share of care employment, while a negative relationship is anticipated with the wage ratio and female unpaid care. In the second model, a positive relationship is expected between the segregation index[9] and the wage ratio, female unpaid care, male education, and the care share, while a negative relationship is anticipated with male unpaid care and the education ratio.

4.2. Results

Table 2 shows regression results for female employment share (model 1), and table 3 displays results for the segregation index (model 2).[10] The first column shows the results for the 23 major cities with city-fixed effects and without quarter year-fixed effects. The second column presents the regression for the 23 cities with year and city-fixed effects. Columns 3, 4, and 5 show the regression results for cities in the Central, Caribbean-NE, and Peripheral regions, respectively, with city and quarter year-fixed effects.

Our analysis helps us identify sectors closely associated with the share of female employment. Our results help establish which sectors have a greater association between increasing their importance in the employed population and boosting the participation of women in total employment, and we also show that the structure of the economy affects results by gender in the labor market.

The findings for the 23 cities, accounting for city and quarter-year fixed effects, are presented in column 2. Sectors exhibiting an association with the female share in total employment include care, manufacturing, and commerce. Notably, the wage gap does not emerge as a significant determinant of the proportion of women in the workforce. Moreover, it appears that female employment share diminishes with increasing levels of women's educational attainment compared to men's—a counterintuitive outcome warranting further investigation. The results across various regions reveal potential variations in the association between the care employment share and the female share in total employment. While statistically significant at the 10% level for the central and Peripheral regions, this association does not hold for the Caribbean-NE region. However, it's important to note that due to a considerable drop in observations when analyzing results for each region separately, these findings should be interpreted with extreme caution.

Table 3 shows that increasing female labor force participation is associated with less sectoral segregation, meaning that women newly employed are more equally distributed across sectors. This result is consistent with Borrowman & Klasen (2020), who also find that female labor force participation negatively correlates with sectoral segregation. It is also observed that increases in the share of the care sector, which predominantly employs women, are positively associated with heightened sectoral segregation. The coefficient is statistically significant within the total sample of 23 cities. Furthermore, an increase in employment shares within the mining and construction, as well as service sectors, is positively correlated with increased sectoral segregation, indicating that potential expansions in employment within these sectors primarily favor one gender. Additionally, segregation decreases with more years of education for men. As for the results regarding the regions, the only region in which an increase in the care sector leads to heightened segregation is the Peripheral region. This suggests that in less developed contexts, an expansion of the care sector may result in women predominantly being assigned to care occupations.

[9] As a measure of occupational segregation, the Duncan Index captures the difference between the share of women in every sector and women's share of employment as a whole. A value close to 0 indicates a better distribution of women in the workforce, while a value close to 1 indicates higher gender segregation into certain sectors.

[10] In the context of this study, city-level data collected over time may be influenced by unique characteristics of each city such as local economic policies, cultural factors, and industrial composition. Thus, employing fixed effects allows us to control for these city-specific factors that may affect the relationship between the variables of interest.

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TABLE 2.
Drivers of female employment share

	(1)	(2)	(3)	(4)	(5)
	Ln female share	Ln female share	Ln female share	Ln female share	Ln female share
Ln wage ratio	0.04*	0.02	-0.01	0.07**	-0.04
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Ln male unpaid care	-0.03**	-0.02	-0.01	-0.01	0.01
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
Ln female unpaid care	0.05*	0.03	-0.00	0.04	0.02
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)
Ln education ratio	-0.20***	-0.29***	-0.19*	-0.41**	-0.20***
	(0.06)	(0.08)	(0.10)	(0.15)	(0.05)
Ln male education	0.09	-0.08	-0.03	-0.04	-0.08**
	(0.07)	(0.08)	(0.08)	(0.17)	(0.03)
Ln care share	0.11**	0.10**	0.09*	0.10	0.10*
	(0.04)	(0.04)	(0.05)	(0.08)	(0.05)
Ln agriculture share	-0.01	-0.01	0.00	-0.01	0.00
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Ln other share	-0.00	-0.00	0.00	-0.01***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Ln manufacture share	0.06**	0.06**	0.06*	0.04	0.06
	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)
Ln commerce share	0.13**	0.10*	0.08	0.09	0.16
	(0.06)	(0.06)	(0.06)	(0.13)	(0.09)

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TABLE 2. CONT.
Drivers of female employment share

	(1)	(2)	(3)	(4)	(5)
	Ln female share	**Ln female share**	**Ln female share**	**Ln female share**	**Ln female share**
Ln mining and const. share	0.02	-0.01	-0.01	-0.02	0.00
	(0.02)	(0.02)	(0.02)	(0.04)	(0.03)
Ln services share	0.23**	0.13	0.14	0.08	0.22
	(0.09)	(0.09)	(0.08)	(0.17)	(0.14)
Constant	-0.33	-0.20	-0.13	-0.56	0.13
	(0.45)	(0.49)	(0.40)	(0.87)	(0.59)
R-squared	0.203	0.347	0.411	0.582	0.326
Observations	966	966	294	336	336
City fixed effects	Yes	Yes	Yes	Yes	Yes
Quarter year-fixed effects	No	Yes	Yes	Yes	Yes
Region	23 cities	23 cities	Central	Caribbean-NE	Peripheral

Notes: Robust standard errors reported in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

TABLE 3.
Drivers of sectoral segregation

	(1)	(2)	(3)	(4)	(5)
	Ln segregation index	**Ln segregation index**	**Ln segregation index**	**Ln segregation index**	**Ln segregation index**
Ln wage ratio	0.02	0.03	0.03	0.04*	0.05
	(0.02)	(0.02)	(0.06)	(0.02)	(0.04)
Ln participation ratio	-0.24**	-0.29**	-0.40*	-0.26	0.01
	(0.11)	(0.12)	(0.18)	(0.15)	(0.15)

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TABLE 3. CONT.
Drivers of sectoral segregation

	(1)	(2)	(3)	(4)	(5)
	Ln segregation index	Ln segregation index	Ln segregation index	Ln segregation index	Ln segregation index
Ln male unpaid care	-0.01	-0.01	-0.01	-0.00	-0.06*
	(0.03)	(0.03)	(0.04)	(0.05)	(0.03)
Ln female unpaid care	-0.00	0.00	-0.07	-0.04	0.14**
	(0.02)	(0.03)	(0.04)	(0.03)	(0.06)
Ln education ratio	-0.08	-0.19	-0.69	-0.10	0.01
	(0.12)	(0.15)	(0.47)	(0.14)	(0.11)
Ln male education	-0.68***	-0.79***	-1.20*	-0.47***	-0.74***
	(0.08)	(0.13)	(0.53)	(0.10)	(0.15)
Ln care share	0.15***	0.15***	0.16	0.18	0.17**
	(0.05)	(0.05)	(0.09)	(0.15)	(0.05)
Ln agriculture share	0.02*	0.01	-0.01	0.04**	0.00
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
Ln other share	0.03***	0.03***	0.02	0.04*	0.05***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
Ln manufacture share	-0.04	-0.02	-0.13**	0.03	0.04
	(0.03)	(0.03)	(0.05)	(0.09)	(0.05)
Ln commerce share	-0.10	-0.07	-0.41**	0.12	-0.00
	(0.11)	(0.11)	(0.12)	(0.29)	(0.10)
Ln mining and const. share	0.17***	0.17***	0.09	0.20*	0.21***
	(0.03)	(0.03)	(0.05)	(0.09)	(0.04)

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TABLE 3. CONT.
Drivers of sectoral segregation

	(1)	(2)	(3)	(4)	(5)
	Ln segregation index	**Ln segregation index**	**Ln segregation index**	**Ln segregation index**	**Ln segregation index**
Ln services share	0.40**	0.35**	-0.00	0.56	0.39**
	(0.15)	(0.16)	(0.15)	(0.42)	(0.15)
Constant	1.56**	1.84***	1.49	2.23	1.81***
	(0.58)	(0.55)	(1.02)	(1.68)	(0.51)
R-squared	0.245	0.287	0.420	0.379	0.412
Observations	966	966	294	336	336
City fixed effects	Yes	Yes	Yes	Yes	Yes
Quarter year-fixed effects	No	Yes	Yes	Yes	Yes
Region	23 cities	23 cities	Central	Caribbean-NE	Peripheral

Notes: Robust standard errors reported in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

5. Conclusions

The care provision, measured through paid care work, can drive gender equality, measured as the share of women in total employment. More care provision means more supply of services provided by the market or the government. This paper described two processes that can emerge when expanding the care sector. One is due to an increased demand for care workers. Given existing high segregation in care activities, where women represent more than 75%, this greater demand entails an increase in the number of female jobs in this sector and, therefore, everything else being constant, the share of women in total employment increases.

The second effect arises from the potential externalities, or spillovers, of the expansion of the care provision to sectors other than care. For example, more care services could lessen the care burden and allow women to participate and compete for male dominated jobs. If this happens, women would increase their participation in traditionally masculinized sectors. One way to assess which of the two effects dominates is through the segregation index. If the first-order effect dominates, a higher segregation rate will occur since women would concentrate in feminized paid care activities. Conversely, if the second-order effect dominates, then a reduction in the segregation index should be expected.

The econometric results show that the first-order effect dominates, but context might be essential in determining which of the two effects is stronger. In the Central most competitive region, the expansion of care services is associated with an increase in the female share of employment. On the other hand, in the Peripheral region, with a less competitive environment and low share of female employment, expansion of the care sector also boosted female employment and a positive association was found for segregation. In this context, care may play a minor role due to the low level of development and deficiencies in basic infrastructure such as water and sewage systems, which constitute a type of infrastructure essential for the care sector and, therefore, highly relevant to improving gender equality. However, our results should be taken cautiously as they indicate associations rather than causal links.

References

Almeida, E. R. F., Araújo, V., & Gonçalves, S. L. (2022). Urban wage premium for women: Evidence across the wage distribution. *World Development*, *159*. https://doi.org/10.1016/j.worlddev.2022.106059

Antonopoulos, R., Kim, K., Masterson, T., & Zacharias, A. (2010). Investing in Care: A Strategy for Effective and Equitable Job Creation. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1659726

Aristizábal, J. M., & García, G. A. (2021). Regional economic growth and convergence: The role of institutions and spillover effects in Colombia. *Regional Science Policy & Practice*, *13*(4), 1146-1162.

Asai, Y. (2015). Parental leave reforms and the employment of new mothers: Quasi-experimental evidence from Japan. *Labour Economics*, *36*, 72-83. https://doi.org/10.1016/j.labeco.2015.02.007

Baker, M., Gruber, J., & Milligan, K. (2008). Universal Child Care, Maternal Labor Supply, and Family Well-Being. *Journal of Political Economy*, *116*(4), 709-745.

Barua, R. (2014). Intertemporal substitution in maternal labor supply: Evidence using state school entrance age laws. *Labour Economics*, *31*, 129-140. https://doi.org/10.1016/j.labeco.2014.07.002

Borrowman, M., & Klasen, S. (2020). Drivers of Gendered Sectoral and Occupational Segregation in Developing Countries. *Feminist Economics*, *26*(2), 62-94. https://doi.org/10.1080/13545701.2019.1649708

Budig, M. J., & Misra, J. (2010). How care-work employment shapes earnings in cross-national perspective. *International Labour Review*, *149*(4), 441-460. https://doi.org/10.1111/j.1564-913X.2010.00097.x

Carta, F., & Rizzica, L. (2018). Early kindergarten, maternal labor supply and children's outcomes: Evidence from Italy. *Journal of Public Economics*, *158*, 79-102. https://doi.org/10.1016/j.jpubeco.2017.12.012

Cascio, E. U. (2009). Maternal Labor Supply and the Introduction of Kindergartens into American Public Schools. *The Journal of Human Resources*, *44*(1), 140-170.

Cascio, E. U., Haider, S. J., & Nielsen, H. S. (2015). The effectiveness of policies that promote labor force participation of women with children: A collection of national studies. *Labour Economics*, *36*, 64-71. https://doi.org/10.1016/j.labeco.2015.08.002

Duque, J. C., García, G. A., Herrera-Idárraga, P., & López-Bazo, E. (2016). *Heterogeneidad regional en las diferencias por género de las tasas de desempleo*. (pp. 101-133). https://repositorio.banrep.gov.co/handle/20.500.12134/10084

England, P., Budig, M., & Folbre, N. (2002). Wages of Virtue: The Relative Pay of Care Work. *Social Problems*, *49*(4), 455-473. https://doi.org/10.1525/sp.2002.49.4.455

Esquivel, V. (2010). Care workers in Argentina: At the crossroads of labour market institutions and care services. *International Labour Review*, *149*(4), 477-493. https://doi.org/10.1111/j.1564-913X.2010.00099.x

Farné, S. (2010). *Encuestas de hogares para dummies: Cómo interpretar la transición de las encuestas continuas a la gran encuesta integrada* (No. 008274). Universidad Externado de Colombia.

Fitzpatrick, M. D. (2010). Preschoolers Enrolled and Mothers at Work? The Effects of Universal Prekindergarten. *Journal of Labor Economics*, *28*(1), 51-85. https://doi.org/10.1086/648666

Fitzpatrick, M. D. (2012). Revising Our Thinking About the Relationship Between Maternal Labor Supply and Preschool. *Journal of Human Resources*, *47*(3), 583-612.

Folbre, N. (2006). Demanding Quality: Worker/Consumer Coalitions and "High Road" Strategies in the Care Sector. *Politics & Society*, *34*(1), 11-32. https://doi.org/10.1177/0032329205284754

Folbre, N. (2018). The Care Penalty and Gender Inequality. In Susan L. Averett, Laura M. Argys, and Saul D. Hoffman (Eds.) *The Oxford Handbook of Women and the Economy*, 748–66. Oxford University Press.

Fuchs, M., Rossen, A., Weyh, A., & Wydra-Somaggio, G. (2021). Where do women earn more than men? Explaining regional differences in the gender pay gap. *Journal of Regional Science*, *61*(5), 1065-1086.

Geyer, J., Haan, P., & Wrohlich, K. (2015). The effects of family policy on maternal labor supply: Combining evidence from a structural model and a quasi-experimental approach. *Labour Economics*, *36*, 84-98. https://doi.org/10.1016/j.labeco.2015.07.001

Givord, P., & Marbot, C. (2015). Does the cost of child care affect female labor market participation? An evaluation of a French reform of childcare subsidies. *Labour Economics*, *36*, 99-111. https://doi.org/10.1016/j.labeco.2015.07.003

Glaeser, E. L., & Maré, D. C. (2001). Cities and Skills. *Journal of Labor Economics*, *19*(2), 316-342. https://doi.org/10.1086/319563

Goux, D., & Maurin, E. (2010). Public school availability for two-year olds and mothers' labour supply. *Labour Economics*, *17*(6), 951-962. https://doi.org/10.1016/j.labeco.2010.04.012

Haeck, C., Lefebvre, P., & Merrigan, P. (2015). Canadian evidence on ten years of universal preschool policies: The good and the bad. *Labour Economics*, *36*, 137-157. https://doi.org/10.1016/j.labeco.2015.05.002

Havnes, T., & Mogstad, M. (2011). Money for nothing? Universal child care and maternal employment. *Journal of Public Economics*, *95*(11-12), 1455-1465. https://doi.org/10.1016/j.jpubeco.2011.05.016

Herrera-Idárraga, P., & Hernández, H. M. (2022). *Infraestructura social de cuidado en las ciudades de Colombia. Quanta - Cuidado y Género.* https://cuidadoygenero.org/wp-content/uploads/2022/11/Infraestructura_cuidado_ciudades.pdf

Ilkkaracan, I., Kim, K., & Kaya, T. (2015). *The Impact of Public Investment in Social Care Services on Employment, Gender Equality, and Poverty: The Turkish Case*. 73.

Ilkkaracan, I., Kim, K., Masterson, T., Memiş, E., & Zacharias, A. (2021). The impact of investing in social care on employment generation, time-, income-poverty by gender: A macro-micro policy simulation for Turkey. *World Development*, *144*, 105476. https://doi.org/10.1016/j.worlddev.2021.105476

ILO. (2017). *World Employment Social Outlook.* 72.

ILO. (2018). *Care work and care jobs for the future of decent work.* International Labour Office. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_633135.pdf

Kreimer, M. (2004). Labour Market Segregation and the Gender-Based Division of Labour. *European Journal of Women's Studies*, *11*(2), 223-246. https://doi.org/10.1177/1350506804042097

Lundin, D., Mörk, E., & Öckert, B. (2008). How far can reduced childcare prices push female labour supply? *Labour Economics*, *15*(4), 647-659. https://doi.org/10.1016/j.labeco.2008.04.005

Müller, K.-U., & Wrohlich, K. (2020). Does subsidized care for toddlers increase maternal labor supply? Evidence from a large-scale expansion of early childcare. *Labour Economics*, *62*, 101776. https://doi.org/10.1016/j.labeco.2019.101776

Nollenberger, N., & Rodríguez-Planas, N. (2015). Full-time universal childcare in a context of low maternal employment: Quasi-experimental evidence from Spain. *Labour Economics*, *36*, 124-136. https://doi.org/10.1016/j.labeco.2015.02.008

Organization for Economic Cooperation and Development (OECD). (2014). *Unpaid care work: The missing link in the analysis of gender gaps in labour outcomes.* (Policy brief). OECD Development Centre.

Onaran, Ö., Oyvat, C., & Fotopoulou, E. (2022). A Macroeconomic Analysis of the Effects of Gender Inequality, Wages, and Public Social Infrastructure: The Case of the UK. *Feminist Economics*, *28*(2), 152-188. https://doi.org/10.1080/13545701.2022.2044498

Oyvat, C., & Onaran, Ö. (2022). The effects of social infrastructure and gender equality on output and employment: The case of South Korea. *World Development*, *158*. https://doi.org/10.1016/j.worlddev.2022.105987

Peng, I. (2010). *The expansion of social care and reform: Implications for care workers in the Republic of Korea.* https://doi.org/10.1111/j.1564-913X.2010.00098.x

Quevedo Rocha, I. K., Herrera-Idárraga, P., & Hernández, H. M. (2021). *Condiciones laborales de las y los trabajadores del cuidado en Colombia. Quanta - Cuidado y Género.* https://cuidadoygenero.org/wp-content/uploads/2021/10/Condiciones-laborales.pdf

Seguino, S., & Braunstein, E. (2019), The Costs of Exclusion: Gender Job Segregation, Structural Change and the Labour Share of Income. *Development and Change*, *50*, 976-1008. https://doi.org/10.1111/dech.12462

Tribin A., García-Rojas, K. Herrera-Idarraga, P., Morales, L.F & Ramirez-Bustamante, N. (2023) Shecession: The Downfall of Colombian Women During the Covid-19 Pandemic. *Feminist Economics*, *29*(4), 158-193. https://doi.org/10.1080/13545701.2023.2230218

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