Measuring the Gender Wage Gap in Puerto Rico

ABEXUS ™
ANALYTICS

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I.   Executive Summary and Recommendations

The increase in female labor market participation is one of the most positive economic trends observed between 2017 and 2023. Female labor participation rose from approximately 33% to 38%, while male labor participation increased from 48% to 51%. This rise in female participation is critical for economic growth and equity, underscoring the need for policies that support women's continued engagement in the workforce, such as improved access to childcare, flexible work arrangements, and robust anti-discrimination laws.

However, our analysis of firm-level administrative data has shown that the disaster-relief driven economic recovery post-COVID-19 has not benefited Puerto Rican men and women equally. Men have disproportionately benefited from the economic recovery. Average wages for men rose 15% from 2019 to 2023, compared to only 9% for women. Similarly, median wages for men increased by 15%, whereas for women, the increase was a mere 2%. In 2023, women earned 82 cents for every dollar earned by men in terms of median wages, down from 92 cents in 2019. Contrary to the experience in the U.S. the gender pay gap in Puerto Rico has not only persisted, but has actually widened.

We also found women face substantial pay disparities across most industries, regardless of whether they are over- or underrepresented in those fields. Even in sectors with high female representation, women earn significantly less than men, and the gap becomes more pronounced as salaries increase. This pervasive inequality underscores the systemic barriers that prevent women from achieving equitable compensation and advancing into higher-paying positions. In other words, the analysis reveals a persistent glass ceiling effect, where women face barriers to advancing into higher-paying roles. This is particularly evident in the income strata analysis, which shows that the gender gaps widen significantly at higher income levels.

Addressing gender inequality is not just a moral imperative but an economic necessity. High levels of inequality drag down economic growth (OECD, 2015). In Puerto Rico, achieving gender pay equity is essential for broader economic progress. Ensuring that women receive equal pay for equal work can contribute to reducing poverty rates and income inequality, leading to a stronger tax base, robust economic growth, and ultimately, sustainable economic development.

Based on our main empirical findings and review of the academic literature, the following conditions should be prioritized to improve the accuracy of any gender pay gap analysis in the future:

1. The Puerto Rico Department of Labor should consider the development of data gathering mechanisms at a firm level, in order to capture detailed information about their employees[1]. This should encompass age, educational attainment, hours worked, work experience, occupation, industry, job level, employment type, parental status, tenure with employer, bonuses and other compensation, and average pay levels broken down by sex, for categories of employees performing the same work or work of equal value. The agency should facilitate the process for employers by providing a template or online submission platform.

    i. This should be accompanied by a system that automatically calculates employer-level gender pay gaps.

    ii. The Department of Labor could use the collected data to publish an annual Gender Pay Gap Report and create public resources available online that compile aggregate pay data across industries such that employees are able to benchmark their pay against broader standards.

2. Economic literature recognizes that "pay transparency" mechanisms reduces wage disparities and tend to reduce information asymmetries.

3. Support for childcare and gender-neutral parental leave. These include support for early child development programs, after-school programs, elderly care programs and flexible work arrangements.

4. Promote women's continued labor market participation while ensuring equal opportunities for advancement.

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[1] Some of the basic data could be incorporated into the quarterly findings.

II.   Introduction

The gender pay gap is a longstanding and critical issue in labor economics, with substantial evidence indicating that, on average, men earn more than women across various sectors and regions. This disparity is not uniform; it varies significantly by country and industry, underscoring the necessity for localized data and nuanced analysis to fully understand its extent and underlying causes (Hedija, 2017; Kochhar, 2023).

More recently, pay transparency has increasingly become a policy tool for governments in the OECD[2] to implement in hopes of reducing the gender pay gap. More than half of the 38 OECD countries now require regular reporting by private sector firms on their gender wage gaps (OECD, 2023). Some evidence in the literature suggests narrowing gender pay gaps due to pay transparency policies in various settings, including Canadian universities, the U.K., and Switzerland (Bennedsen, Larsen, & Wei, 2022; Bennedsen et al., 2022). However, other studies suggest a lack of significant declines in the gender pay gap despite the presence of equal pay audits (Swedish National Audit Office, 2019). Similarly, the persistence of the gender pay gap in the United States, where women earned approximately 82 cents for every dollar earned by men in 2022, mirrors global trends and highlights the slow progress in narrowing this gap over the past two decades (Kochhar, 2023).

Historically, most economic studies attempting to quantify the gender pay gap have leaned on a statistical decomposition method estimating how much of the wage differential between men and women can be explained by certain factors (Pelletier, Patterson, & Moyser, 2019). However, a significant portion of the gap remains unexplained, indicating the presence of biases and other less tangible factors (U.S. Department of Labor, 2021).

This disparity not only affects economic outcomes for individuals and families but also impacts the overall economy. Addressing the gender pay gap is not merely a matter of equity; it has significant economic implications. Reducing the gap can enhance growth, productivity, competitiveness, and the sustainability of economies (OECD, 2023). The OECD emphasizes that closing the gender gap in participation rates and hours worked could significantly boost economic growth in the coming decades. Conversely, failing to address this issue risks future economic prosperity. This is particularly relevant for Puerto Rico given its current and forthcoming demographic profile.

However, the literature on Puerto Rico is scarce. Our study aims to provide a comprehensive analysis of the gender pay gap in Puerto Rico, leveraging both local data and broader global insights to inform policy recommendations. Moreover, we try to overcome the potential distortions associated with self-reported income data that is usually cited in Puerto Rico.

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[2] Organization for Economic Co-operation and Development.

II.1. Previous International Studies on the Gender Pay Gap

In the United States, the gender pay gap has shown little improvement over the past two decades. In 2022, women earned approximately 82 cents for every dollar earned by men, a minimal increase from 80 cents in 2002 (Kochhar, 2023). This stagnation contrasts sharply with the progress made in the 1980s and 1990s. The gap persists despite women being more likely than men to have graduated from college, indicating that factors other than education are at play. Parenthood is a significant factor, with mothers less likely to be in the labor force and working fewer hours (the 'motherhood penalty'), while fathers experience a "fatherhood wage premium" that widens the pay gap (Kochhar, 2023).

Many gender-specific constraints are discussed as barriers to the economic success of women compared with men (Kabeer, 2012). The excessive burden of unpaid care work and the lack of jobs with flexible work arrangements or schedules are usually flagged as critical factors. Flexibility requirements are considered necessary due to challenges in balancing paid work and unpaid care work (childcare, household tasks, and elder care), especially when traditional gender roles prevail. There is consensus among the academic literature on the fact that "unpaid work performed disproportionately by women creates broad social benefits, yet women pay the price for doing that work in the form of lower earnings relative to men" (Moyser, 2019).

Claudia Goldin, the Nobel Prize-winning economist, has produced seminal work on gender convergence in the labor market, which has been pivotal in understanding the long-term trends and underlying causes of the gender pay gap. Goldin (2014) discusses how various factors such as labor market interruptions, part-time work, and the need for workplace flexibility disproportionately affect women. Her research indicates that inflexibility in work schedules, particularly in high-paying occupations where long hours are valued, is among the most significant present-day barriers to gender pay equality.

Workforce interruptions are also noted as a significant factor contributing to the gender pay gap. For example, the presence of long-term leave (such as medical leave) is also relevant. According to Blau & Kahn (2017), interruptions in work continuity reduce opportunities for workplace training for women and lead to the depreciation of human capital, resulting in lower wages. Women are also more likely to quit jobs for family-related reasons, while men do so for job-related reasons (Blau & Kahn, 2017). Similarly, the accessibility and affordability of early childhood education and care often influence the decision of parents to work or exit the labor force (OECD, 2023).

In general, there is a vast body of academic literature exploring gender pay disparities across different sectors and regions as well. In Canada, almost two-thirds of the gender wage gap remained unexplained after accounting for typical known factors such as educational attainment, job characteristics, and the concentration of men versus women in higher-paying occupations or industries (Pelletier, Patterson, & Moyser, 2019).

As previously mentioned, this unexplained portion is frequently assumed to be a measure of the extent of biases and other less tangible factors. Others add it may also include dynamics of compensating wage differentials or unmeasured productivity (Blau

& Kahn, 2017; U.S. Department of Labor, 2019). For example, unmet training needs are another possible explanation for the gender pay gap (Blau & Kahn, 2017). Canadian women are less likely than men to receive paid formal training from their employer and more likely to pay for formal training themselves, indicating higher financial burdens for women attempting to gain skills (Deng, 2021). Gender gaps in experiential learning also contribute to the gender pay gap. The OECD points out that women are underrepresented in fields such as construction, manufacturing, and engineering, where apprenticeships are common (OECD, 2023).

Despite the ongoing work to identify all possible roots to the unexplained portion of the gap, there is little doubt that several gender-biased practices are a major factor across the world. There is ample evidence pointing to a relationship between discriminatory social attitudes and pay gaps (Janssen, Sartore, & Backes-Gellner, 2014). Harassment, particularly sexual harassment, is also linked to labor market inequality and contributes to gender segregation across workplaces. A Swedish study discussing the link between sexual harassment and labor market inequality, attributes about one-tenth of the raw gender wage gap to sexual harassment (Folke & Rickne, 2022).

On the other hand, it is worth noting that the gig economy also reveals persistent gender pay gaps. This gap arose even in a labor market characterized by anonymity, relatively homogeneous work, and flexibility (Litman et al., 2020). This highlights that our modern economies are structurally conditioned to such an extent that gender pay gaps can arise even independently of overt discrimination, labor segregation, and inflexible work arrangements.

Gender pay gaps are also particularly pronounced in STEM fields across the world. In Poland, for instance, women with STEM degrees earn over 20% less than their male counterparts in their first year after graduation, and this gap widens over time. Significant variation exists across different STEM fields, with the gap largest among mathematics graduates at over 25%, and less than 3% among chemical and Earth sciences graduates (Zając et al., 2023). This suggests that increasing the number of women earning STEM degrees may not be sufficient to achieve gender pay equality without addressing deeper systemic issues.

In the realm of managerial styles or 'leadership regimes,' a study using a large, linked employer-employee dataset from Germany examined differences in the unexplained gender pay gap between owner-run and manager-run firms. It was hypothesized that owner-managers and hired-managers differ in their discretion to engage in discrimination against women. The study found that unexplained gaps are significantly higher in owner-run firms. However, when restricting the analysis to firms that only differ in leadership regime, this difference disappears. In other words, more prevalent gender discrimination was not related to owner-managers being more discriminatory per se, but rather to the fact that many owner-run firms lacked collective bargaining agreements and/or lacked representative bodies elected by employees within a company to

represent their interests (Hirsch & Mueller, 2014). This finding is particularly relevant for Puerto Rico due to its significantly low labor union membership rate.

In sum, factors such as unpaid care work being disproportionately imposed on women, lack of childcare along with inflexible jobs, lack of worker representation, and discriminatory practices all contribute to the persistence of gender pay disparities across different sectors and regions. Academic literature underscores the complexity of the gender pay gap and the necessity of multi-faceted approaches to address it.

III. The Gender Pay Gap in Puerto Rico

Puerto Rico's high levels of income inequality are significantly driven by gender inequality. As Colón Warren (2010) observes, the link between female-headed households and economic hardship in Puerto Rico is clear, with women disproportionately facing financial instability due to systemic inequities in the job market, leading to diminished earnings across various sectors and levels of education. This predicament worsened during the prolonged economic depression of the 2010s. The economic contraction and government downsizing led to extensive job reductions that disproportionately affected women, who were often the primary earners in their families (Rodríguez Coss, 2020).

High levels of poverty and inequality significantly hinder economic growth (OECD, 2015). In Puerto Rico, this implies that gender inequality significantly hinders the island's economic recovery. Thus, addressing gender inequality is crucial for fostering broader economic progress. By tackling the systemic issues that contribute to gender inequality, Puerto Rico can unlock the full potential of its workforce and pave the way for economic growth, a stronger tax base, and ultimately, sustainable economic development.

III.1. Act 16-2017

Ensuring that women receive equal pay for equal work is one of these crucial systemic issues. During 2017, Puerto Rico enacted Act 16-2017 also known as the "Puerto Rico Equal Pay Act" or "Ley de Igualdad Salarial de Puerto Rico". The Act provides several mechanisms d to address and reduce gender-based wage discrimination on the Island. Also, it aims to ensure that employees, regardless of gender, receive equal pay for equal work, taking into account factors such as skills, effort, and responsibility. Wage differences are only permissible if based on seniority, merit, a system measuring earnings by quantity or quality of production, or any other bona fide factor other than gender, such as education, experience, or training. Moreover, Act 16-2017 provides several key actions that try to reduce wage discrimination, such as:

Ban on Salary History Inquiries:

- Employers are prohibited from asking job applicants about their salary history during the hiring process. The intent behind this is to prevent perpetuating historical wage inequalities that could disadvantage women and other marginalized groups.

Pay Transparency:

- The law encourages transparency by prohibiting employers from retaliating against employees who discuss or inquire about their own wages or the wages of other employees. This provision empowers employees to be informed about wage structures, which can help uncover and address pay disparities.

Voluntary Self-Evaluation:

- Employers are encouraged, though not required, to conduct a self-evaluation of their pay practices to ensure they are compliant with the equal pay provisions of Act 16-2017. The self-evaluation involves reviewing compensation policies, job classifications, and pay scales to identify any gender-based wage disparities. The law provides an incentive for employers to conduct this self-evaluation by offering a potential reduction in liability. If an employer can demonstrate that they conducted a thorough and reasonable self-evaluation and made progress toward eliminating any identified wage gaps, this can be a mitigating factor if they face legal action under the law.

Anti-Retaliation Protections:

- The law includes strong anti-retaliation provisions. Employers cannot retaliate against employees who assert their rights under the Act, such as filing a complaint or participating in an investigation or proceeding related to wage discrimination.

Civil Penalties and Remedies:

- Employers who violate the Act may be subject to civil penalties, including fines. Employees who have experienced wage discrimination can file a complaint with the Puerto Rico Department of Labor and Human Resources or take legal action to recover back pay, damages, and legal fees.

III.2.   Rule 9162

After the enactment of Act 16-2017 (the "Puerto Rico Equal Pay Act"), the Puerto Rico Department of Labor and Human Resources (Departamento del Trabajo y Recursos Humanos, DTRH) was tasked with creating guidelines and regulations to implement the law effectively (Rule 9162). These regulations and guidelines are designed to provide clarity on how the law should be applied and enforced.

The regulations also outline the specific responsibilities of employers under the law, including guidelines on conducting the voluntary auto-evaluation process, managing pay transparency, and ensuring non-retaliation. For instance, there are detailed guidelines on conducting pay audits, implementing pay transparency measures, and ensuring that hiring practices do not perpetuate gender-based wage discrimination. The guidelines also help employers understand how to properly document their self-evaluation processes and the steps they should take if disparities are identified. If certain criteria is met, the employer could be eligible for a certification of compliance issues by the DTRH.

Employers who wish to obtain the Certification of Compliance must submit an application to the DTRH, providing documentation that demonstrates the completion of a self-evaluation and the steps taken to address any pay disparities. The DTRH will review the application and accompanying documentation to ensure that the self-evaluation was conducted in good faith and that the employer has made genuine efforts to comply

with the law. If the DTRH determines that the employer has met the requirements, it will issue the Certification of Compliance, which the employer can then use to demonstrate their commitment to gender pay equity.

A key aspect of said Rule (Article 13(e)) is the link between public procurement requirements and the equal pay certification. That is, Rule 9162 provides that:

> "The Certification is one of the methods available to any legal entity interested in joining the Single Registry of Bidders, in accordance with Article 45(a)(3) of the General Services Administration Law for the Centralization of Government Procurement in Puerto Rico of 2019, Law No. 73-2019, as amended, to certify that it has a labor policy that guarantees equal pay."

Thus, obtaining a certification from the Puerto Rico Department of Labor and Human Resources (DTRH) is one of the mechanisms that provide access for any legal entity seeking to enter the government's Single Registry of Bidders (*Administración de Servicios Generales*). This certification not only demonstrates compliance with labor policies that promote pay equity but also serves as a prerequisite for participation in government procurement processes[3].

Given the significant reconstruction and recovery expenditures currently underway in Puerto Rico, following the impacts of recent natural disasters, the certification ensures that companies involved in these large-scale projects are committed to fair and equitable labor practices. This is particularly important as the Island's government seeks to allocate resources efficiently and ethically, ensuring that public funds are directed to organizations that uphold the highest standards of equal pay. Being listed in the Single Registry of Bidders opens the door to numerous opportunities within the vast procurement efforts, making the DTRH certification a vital credential for any entity aiming to contribute to Puerto Rico's recovery and growth.

III.3.　Economic Research on Gender Pay Gap in Puerto Rico

Unfortunately, the gender pay gap has been considerably understudied in Puerto Rico. The most rigorous academic study that provides an in-depth analysis of the gender pay gap in Puerto Rico is that of Segarra-Alméstica & Caraballo-Cueto (2019). These authors began by pointing out that, according to data from the *Puerto Rico Community Survey* (PRCS), female median earnings in Puerto Rico exceeded male median earnings for the first time in 2009, a trend that continued throughout the 2010s (Segarra & Caraballo,

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[3] See requirement #5, from ASG's
https://registros.asg.pr.gov/wwwroot/PDFDocuments/RUL/215.pdf

2019). This change was notable, given historical trends, and reflects significant shifts in the labor market and educational achievements among Puerto Rican women.

Segarra & Caraballo, (2019) analyzed data from the Census and PRCS and showed that while the median earnings gap turned negative in 2009 (i.e., women had higher median earnings than men), the mean earnings gap remained positive (i.e., men still had higher mean earnings than women). This divergence arises because high earners skew the mean earnings for men, while median earnings reflect a broader income distribution. Their study also examines employment rates, hours worked, and educational attainment to provide deeper insights into these trends. Historically, males have had higher employment rates and total hours worked, but these differences have decreased. From 2000 to 2014, the employment-to-population ratio difference between men and women decreased from 15% to 9%, and the gap in mean estimated hours worked narrowed from 10% to 5% (Segarra & Caraballo, 2019).

Their research also finds that educational attainment has been a critical factor as well. In 2000, 46% of working men had postsecondary education compared to 65.5% of working women. By 2014, 45% of women had a bachelor's degree or higher, while only 27% of men reported the same. This trend reflects broader historical changes, where from 1970 to 2009, women's college completion rates increased significantly, surpassing those of men. This rise in educational attainment among women is closely linked to the shift from manufacturing to service sector jobs, which often require higher education levels. Despite these advances, disparities persist within educational groups. The median earnings gender gaps remain positive and higher for those with postsecondary degrees, indicating ongoing labor market disparities (Segarra & Caraballo, 2019). The data suggests that while increased work hours and higher educational attainment have improved women's relative standing in the labor market, significant gender earnings gaps remain, especially among those with higher education levels.

The economic transformation in Puerto Rico, characterized by a decline in manufacturing and growth in the service sector, has also influenced these trends. Over the past five decades, the manufacturing employment share in Puerto Rico has remained close to 10%, while the service sector's share rose above 30% (Segarra & Caraballo, 2019). Additionally, women have become more prevalent in public administration and finance, insurance, and real estate sectors, which have seen changes in employment shares due to economic crises. In sum, the evolution of the gender earnings gap in Puerto Rico highlights significant improvements in women's educational attainment and labor force participation. However, persistent disparities within educational groups indicate that achieving true gender equity in earnings requires addressing deeper systemic issues in the labor market (Segarra & Caraballo, 2019).

To better understand these deeper systemic issues, Segarra & Caraballo, (2019) utilized data from the Puerto Rico Community Survey (PRCS) to explore gender earnings disparities with econometric analysis. The dependent variable in their study was mean

earnings per hour, which included both salaries and pay received by self-employed individuals, divided by hours worked. The study controlled for several variables, including age, years of schooling, marital status, number of children, public versus private employment, self-employment status, and work experience (calculated as age minus schooling years minus five).

The researchers found that, on average, women have more years of schooling, are less likely to be married, have more children, and are more likely to be public employees. Men, conversely, have more work experience and are more likely to be self-employed. The study found that the negative gender gap for median hourly earnings is not uniform across all groups. In industrial classifications, only seven out of nineteen groups showed a negative median earnings gender gap, with significant negative gaps in mining, quarrying, and oil and gas extraction (–50.4%), construction (–8.8%), and agriculture, forestry, fishing, and hunting (–7.6%) (Segarra & Caraballo, 2019).

Another primary finding of the referenced research was that when controlling for characteristics such as years of schooling and experience, there is clear evidence of a gender pay gap in earnings disfavoring women, which highlights underlying complexities that might be missed if one only considers median earnings unconditionally. In short, they found a statistically significant result showing that merely being a woman lowers one's average earnings. Three main results explain this finding.

First, a decomposition of the earnings gap by quantiles revealed a positive and increasing unexplained gap. This provides evidence of a glass ceiling effect for Puerto Rican women, which was also found to be exacerbated for female workers with children. This indicates that women face significant barriers at higher earning levels, particularly those with children (Segarra & Caraballo, 2019).

Second, the presence of children in the household significantly influences gender disparities. When the sample is restricted to workers with no children, the disparities effect in propensity score matching decreases, the unexplained gap is reduced, and the glass ceiling effect lessens. For the authors, this suggests that part of the undervaluing of women's work comes from the perception that having children has a negative impact on their work performance. This also implies traditional gender-based parenting roles have a negative impact on women's earnings and heighten gender disparities in the labor market. Nevertheless, the authors highlight that evidence of unequal treatment of women persists even in the absence of children.

Third, their results indicate that men receive a premium when they enter occupations or belong to education groups dominated by women, occasionally referred to as a glass escalator, where men are promoted more easily in occupations where they are underrepresented. Contrary to expectations, lower female representation was also associated with a lower gender earnings gap.

To continue updating and deepening our understanding of gender inequality, further research is essential to capture the evolving nature of gender disparities. The economic

and social landscapes are dynamic, necessitating ongoing studies to refine existing policies and develop new strategies to promote gender equity in the labor market. In accordance with Act 16-2017, our next steps involved conducting a comprehensive study on gender inequality in pay in Puerto Rico. This study is significant as it incorporates more recent data (2023), and thus, provides a more current and accurate analysis of the gender pay gap.

Unlike previous studies that relied on survey data, our study will use administrative data, including quarterly firm filings and individual tax filings. By analyzing detailed and up-to-date administrative data, the report aims to provide a robust and precise assessment of the gender pay gap. This study will provide crucial insight to policy makers to assist in the design of policies that ensure Puerto Rico makes progress towards achieving true gender equity in the labor market, ultimately contributing to broader economic growth and sustainable development.

IV. International Experience: Gender Pay Gap Policies and Data Gathering Mechanisms

To address these disparities, several policy measures are recommended by academic literature. Some of these are already being championed by non-governmental organizations on the Island. For example, the Youth Development Institute (IDJ by its Spanish acronym) has advocated for ensuring access to early child development programs to all children aged 0 to 5 and extending after-school programs to children in public schools (Enchautegui et al. 2019). While the IDJ presents these policies as childhood poverty reduction measures, the feminization of poverty observed in Puerto Rico means they are also policies to combat the gender pay gap.

As has been discussed in the literature, parenthood is a significant factor underlying the wage gap (the 'motherhood penalty'). Policies that provide adequate childcare and promote flexible work arrangements are crucial for supporting women's continued labor market participation, ensuring that women have equal opportunities for advancement, and combating the glass ceiling effect.

Also, parental leave policies have been introduced in some jurisdictions as to allow a gender-neutral approach to early childcare. For instance, Sweden offers one of the most generous and flexible parental leave systems in the world. Parents are entitled to a total of 480 days of paid leave, which can be shared between them. Of these, 90 days are reserved exclusively for each parent (often referred to as the "daddy quota" or "mamma quota"), encouraging fathers to take time off for child-rearing. Spain introduced equal parental leave for both parents in 2021, granting each parent 16 weeks of paid leave, regardless of gender. This leave is non-transferable and mandatory for the first six weeks, ensuring both parents take time off after the birth or adoption of a child.

As previously mentioned, several countries have also implemented robust transparency or reporting mechanisms to address gender pay disparities. In the United Kingdom, mandatory reporting requires companies with 250 or more employees to disclose gender pay gap data annually. UK firms must calculate, report, and publish the percentage of men and women in each hourly pay quarter, average gender pay gap using hourly pay, median gender pay gap using hourly pay, percentage of men and women receiving bonus pay, average gender pay gap using bonus pay, and median gender pay gap using bonus pay (Equality and Human Rights Commission, 2019).

In the U.S., at least at the federal level, employers with more than 100 employees and federal contractors with more than $50,000 in government contracts are subject to specific equal pay requirements under various laws and regulations. These employers must annually file an EEO-1 Report with the Equal Employment Opportunity Commission (EEOC). The EEO-1 Report collects demographic workforce data, including race, gender, and job category information. While the EEO-1 Report does not directly

require reporting on pay data, it provides a foundation for assessing employment practices and potential pay disparities.

Although currently paused, between 2017 and 2019, the EEOC required employers to submit pay data broken down by race, gender, and ethnicity across different job categories (Component 2 of the EEO-1 Report). This data collection was intended to identify potential pay disparities. There has been ongoing debate about whether this requirement will be reinstated or revised in the future.

More recently, several states have also enacted legislation which require publishing salary ranges in job postings. For instance, Colorado's Equal Pay for Equal Work Act (C.R.S. § 8-5-201), require employers to include the pay range and a general description of benefits for each job opening in the job posting. This applies to all jobs that could be performed in Colorado, including remote positions. New York City Pay Transparency Law requires (as of November 1, 2022), that employers with four or more employees (including temporary and part-time employees) include a "good faith" salary range for every job, promotion, or transfer opportunity advertised. The salary range should reflect what the employer genuinely expects to pay for the position. Rhode Island's Equal Pay Law requires (effective January 1, 2023), that employers provide the wage range for a position upon request or at the time of hire, whichever comes first. Employers are also required to provide the wage range for an employee's current position upon request.

The overarching goal of these salary range disclosure policies is to promote pay equity by ensuring that job seekers and employees have access to transparent compensation information. By making salary ranges public, these laws help to reduce information asymmetry, allowing candidates to better evaluate job opportunities and negotiate salaries. These policies are also designed to address and reduce wage disparities, particularly those based on gender and race, by standardizing pay practices and holding employers accountable for equitable compensation.

Germany's Wage Transparency Act allows employees in companies with 200 or more employees to request information about the average pay of colleagues of the opposite sex who perform similar work. This legislation intended to empower employees to challenge pay disparities and promotes transparency within the workplace, leading to a more equitable distribution of wages (Peichl et al. 2019). Nevertheless, in practice, the right to information has had limited impact due to the difficulties involved in requesting the information and proving discrimination in court proceedings. The experience in Germany suggests the right to information may have limited impact if the related policies are not properly designed.

Data should remain at the center of the debate. Thus, providing public resources that compile and publish aggregate pay data across industries can enable employees to benchmark their pay against broader standards.

In Iceland, the Equal Pay Certification requires companies with 25 or more employees to prove they pay men and women equally for work of equal value (Government of Iceland,

2018). This certification involves a rigorous auditing process, ensuring ongoing compliance and reducing gender pay disparities. Firms are required to obtain the certification from "accredited certification bodies" which perform the audit to confirm that they have designed and implemented an "equal pay system" that meets the requirements of the Icelandic Standard Equal Wage Management System. One must keep in mind that Iceland's gender pay gap is among the lowest in the world and the proportion of women who are active on the labor market is one of the highest in the OECD countries. In 2019, 79.0% of women aged 16-74 were active in the labor market (Government of Iceland, 2018).

In 2012, Australia established a new government agency, the Workplace Gender Equality Agency (WGEA), with five main objectives:

1) promote and improve gender equality (including equal remuneration between women and men) in employment and in the workplace;
2) support employers to remove barriers to the full and equal participation of women in the workforce;
3) promote, amongst employers, the elimination of discrimination on the basis of gender in relation to employment matters (including in relation to family and caring responsibilities);
4) foster workplace consultation between employers and employees on issues concerning gender equality in employment and in the workplace; and
5) improve the productivity and competitiveness of Australian business through the advancement of gender equality in employment and in the workplace.

The WGEA requires employers with 100 or more employees to report annually on six gender equality indicators:

1) gender composition of their workforce,
2) gender composition of governing bodies of relevant employers,
3) equal remuneration between women and men,
4) availability and utility of employment terms, conditions and practices relating to flexible working arrangements for employees and to working arrangements supporting employees with family or caring responsibilities,
5) consultation with employees on issues concerning gender equality in the workplace, and
6) reports of sexual harassment and/or harassment on the ground of sex or discrimination.

By requiring firms to submit their reports, the agency not only confirms that businesses are complying with equal pay standards, but also collects data that feeds into Australia's world-leading dataset on gender equality. To facilitate reporting, the agency has created templates where firms can easily incorporate their information (Workplace Gender Equality Agency, 2024).

In Canada, the Pay Equity Act requires employers with 10 or more employees to establish and periodically update a "pay equity plan." As part of their "pay equity plan" employers must:

1) identify the different job classes made up of positions in their workplace;
2) determine whether each job class is predominantly male, predominantly female or gender neutral;
3) determine the value of work of each predominantly female or male job class;
4) calculate the compensation of each predominantly female or male job class, and
5) compare the compensation between predominantly female and male job classes doing work of equal or comparable value.

Once the plan is established, firms are required to increase the compensation of any predominantly female job classes that are receiving less pay than their male counterparts (Government of Canada, 2024).

In Sweden, employers need to perform yearly pay audits to discover, remedy and prevent unfair gender differences in pay and in other terms of employment. The audits must compare both men and women who do similar work, and men and women who do work of equal value; and the employer needs to cooperate with trades unions in this process (Salminen-Karlsson & Fogelberg Eriksson, 2022). However, evaluations by the Swedish National Audit Office have found that, in their current form, the pay audits have limited potential to affect gender pay differences in the labor market. To remedy this, the Swedish National Audit Office recommends that they be redesigned such that the Swedish National Mediation Office can monitor developments in gender pay differences at the employer level (Swedish National Audit Office, 2019).

More recently, the European Union (EU) approved a new pay transparency directive. The directive, established in 2023, aims to reduce the gender pay gap by increasing pay transparency, enforcing compliance, and broadening its scope to include intersectional discrimination (Council of the European Union, 2024). One of the cornerstone measures of the new directive is the requirement for employers to provide clear and accessible information about pay. Employers are now mandated to inform job seekers about the starting salary or pay range for advertised positions. This information must be included in the vacancy notice or communicated ahead of the interview, ensuring that candidates have a clear understanding of the compensation before accepting a position.

Once employed, workers gain the right to request detailed information from their employers about pay levels. Specifically, employees can ask for average pay levels, broken down by sex, for categories of employees performing the same work or work of equal value. Employers must also disclose the criteria used to determine pay and career progression, which are required to be objective and gender-neutral. This transparency aims to dismantle opaque pay structures that can hide discriminatory practices (Council of the European Union, 2024).

The directive also introduces stringent reporting requirements to monitor and address gender pay gaps within organizations. Companies with more than 250 employees must report annually on the gender pay gap within their organization to the relevant national authority. For smaller organizations, those with fewer than 250 but more than 100 employees, the reporting obligation is every three years.

Organizations with fewer than 100 employees are exempt from this requirement. If the reported data reveals a pay gap of more than 5% that cannot be justified by objective, gender-neutral criteria, the company must undertake a joint pay assessment. This assessment is conducted in collaboration with workers' representatives, ensuring that employees have a voice in identifying and addressing pay disparities. This measure aims to foster a proactive approach to closing gender pay gaps and holds employers accountable for unexplained discrepancies (Council of the European Union, 2024).

V.   Industry-Wide Analysis

This section presents a comprehensive analysis of data pertaining to the salaried population in the local market, spanning the period from 2019 to 2023. The primary objective is to identify trends, disparities, and potential explanations for the observed differences in average and median incomes across different genders.

The data analyzed in this report represents people and not jobs. Meaning, salaried workers can have more than one job in a year, in the same way, a person may work in various jobs during the year. For this reason, the total number of employed people will surpass the total number reported in the non-farm salaried jobs report.

V.1. Data Gathering

As with any data driven project the first phase was an extensive data gathering process. Several data sources were requested, processed, standardized, anonymized, and merged into one main data source. These were then used to analyze the wage gap at a state, municipal, and industry level. Wages and gender were extracted from the Quarterly Unemployment Fillings by employers. Over 99.9% of the dataset[4] was classified by gender.

Industry and location data was then acquired from the ES-202. While the American Community Survey (ACS) was utilized as a reference database. Three (3) main data* sources were used in this study:

1. Department of Labor & Human Resources (PR) – Quarterly Unemployment Filings for 2019-Q1 to 2024-Q1.

2. Department of Labor & Human Resources (PR) – ES-202, a quarterly employment database for 2019-Q1 through 2023-Q4.

3. American Community Survey (PR Community Survey) – 2018-2022 5-year estimates.

*All datasets were anonymized, and substituted unique identifiers were implemented to guarantee privacy of individuals and businesses. As such, only data and statistics that prescribes to US Bureau of Labor Statistics (BLS) confidentiality pledge and laws[5] are presented at this report.

V.2.   Annual Distribution of Salaried Individuals

The frequency distribution of salaried individuals (see Figure 1), disaggregated by gender and year, indicates a slight predominance of men compared to women between 2019-2020. However, this disparity is not significantly pronounced and remains relatively constant over time. A notable observation is the increase in the frequency of salaried individuals across all genders in 2021, which may signify a recovery in the labor market

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[4] Individual identifiers were used in conjunction with the Public Social Security names dictionary (1998-2023) to classify 99.9% of the names. All sensitive data, including names were then purged, and social security numbers of individuals were not utilized.
[5] https://www.bls.gov/bls/confidentiality.htm

following the COVID-19 pandemic, thereby reflecting an overall increase in salaried employment. Interestingly, in 2021, the number of salaried women (581,713) marginally surpassed that of men (577,796) at the aggregate level (remaining that way until 2023). Moreover, the highest number of salaried individuals was recorded in 2022 for all genders, suggesting a robust labor market, potentially bolstered by the influx of federal funds among other market variables. Part of the reason the proportion of men and women essentially flipped could be many male workers moved to be self-employed.

Figure 1 – Distribution of Salaried Employees by Gender (all industries)
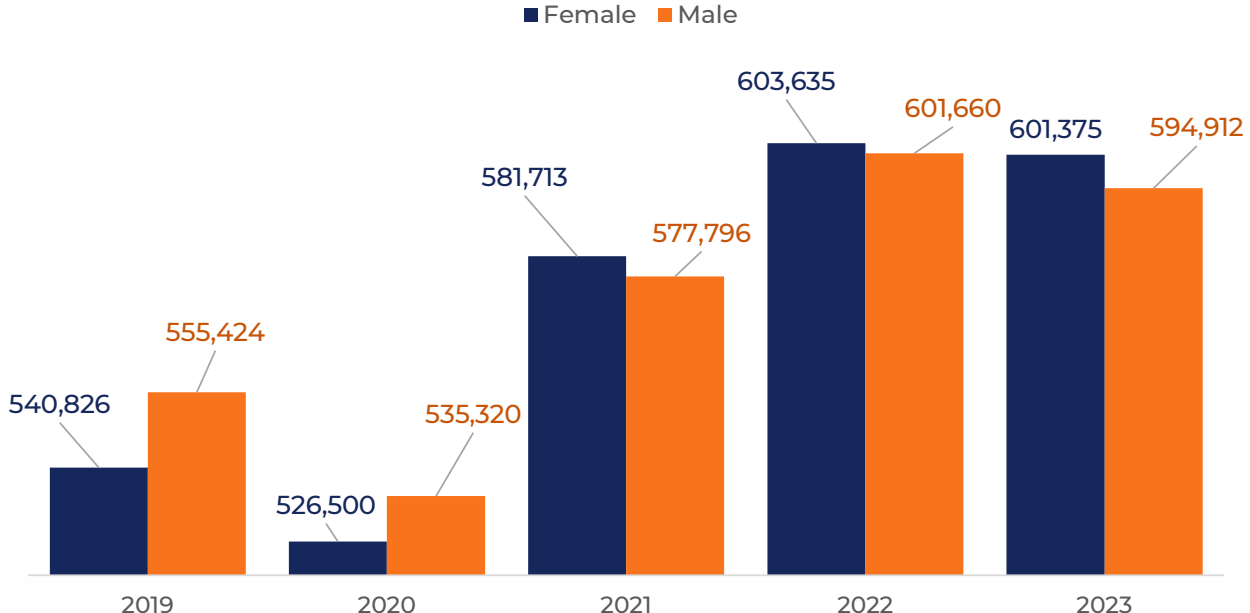
Source: PR Department of Labor & Human Resources

The data reflects the increase in female participation in the labor market during the post-COVID-19 economic recovery. Between 2017 and 2023, female labor participation rose 5 percentage points, from approximately 33% to 38%. Male labor participation only rose 3 percentage points, from approximately 48% to 51%. Despite representing roughly equal shares of salaried employment, female labor participation is still lower than that of male workers because the female population in Puerto Rico is larger than the male population. This rise in female participation is significant because increased female labor market participation is a critical driver of economic growth and equity.

As discussed in the literature review, ensuring that this trend continues requires policies that support women's continued participation, such as improved access to childcare, flexible work arrangements, among others. On the other hand, while the recovery has benefited women in terms of employment, it was male income that saw the largest increase, as will be highlighted below.

V.3.   Average & Median Income by Year and Gender (All Industries)

The data reflects a rise in average nominal wages for both genders from 2019 to 2023, which in turn reflects the broader post-pandemic disaster-relief driven economic recovery in Puerto Rico. However, the recovery has not impacted men and women equally. Average wages for men rose 15% from 2019 to 2023, but only rose 9% in the case of women. Average wages also consistently show a disparity between men and women. On average, men earn more than women throughout the timeframe under study.

The difference in average income ranges between $2,500 and $3,000, with a steady increase observed in 2022 and 2023. As shown in Figure 2, in 2023, the largest disparity in average income is observed, with men earning $23,537 compared to $19,455 for women. This large difference reflects that the gender pay gap is not only persistent, but it has grown larger during the current disaster-relief driven recovery. In terms of average wages, in 2019 women earned 87 cents for every dollar earned by men. As of 2023, women now earn only 83 cents for every dollar earned by men.

Figure 2 – Average Salary by Gender (all industries)

*Figure 2 – Average Salary by Gender (all industries)*
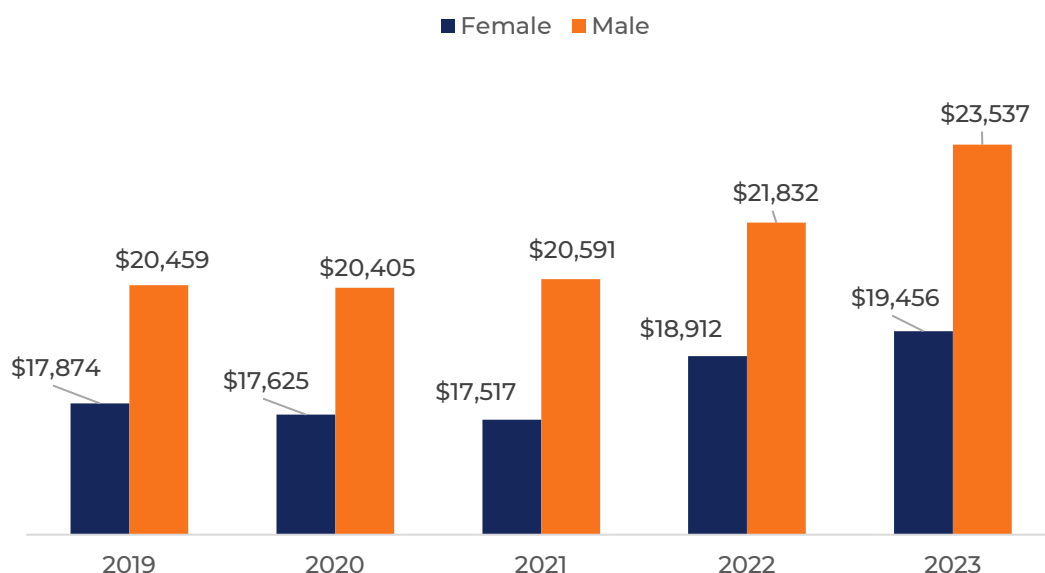
Source: PR Department of Labor & Human Resources

In general, men consistently have a higher median wage than women, although the differences are generally smaller compared to average wages. As was previously noted by Segarra & Caraballo, (2019), the difference between mean and median wages arises because high earners skew the mean earnings for men, while median earnings reflect a broader income distribution.

As in the case of average wages, in 2023, the median wage for men ($15,576) was significantly higher than for women ($12,716), indicating a widening wage gap. This increase in the difference in median wages suggests a larger number of male employees gained access to higher-paying jobs or received salary increments during the economic recovery. Median wages for men rose 15% from 2019 to 2023, but only rose 2% in the case of women. In terms of median wages, in 2019 women earned 92 cents for every dollar earned by men. As of 2023, women now earn only 82 cents for every dollar earned by men.

Figure 3 –Median Salary by Gender (all industries)

■ Female ■ Male

Source: PR Department of Labor & Human Resources
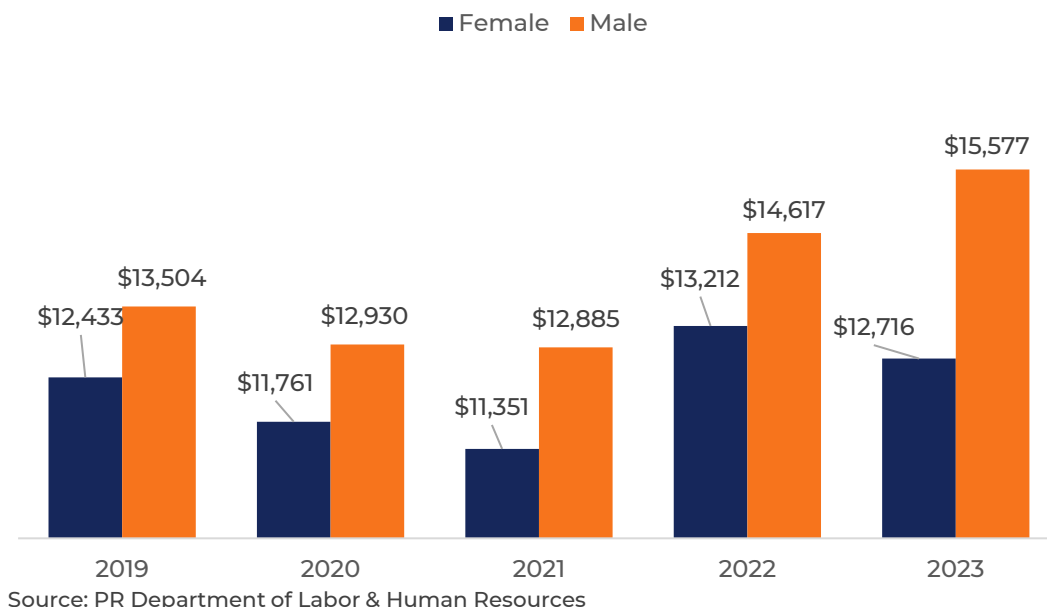
At first glance, our findings may seem to contradict Segarra & Caraballo's observations regarding women having higher unconditional *median* wages than men. However, it is important to note their study was considering salaried *and self-employed workers*, along with the sum of their wage income and self-employment income. Our current exercise is limited to salaried work.

Nonetheless, it is also worth noting that Segarra & Caraballo's analysis included Puerto Rico Community Survey (PRCS) data until 2014. The PRCS 5-year estimates for 2018 through 2022 suggest that even when considering total income, men have reclaimed their position as higher earners in terms of median wages.

According to the PRCS data, male median income had caught up with female median income by 2018. For 2018, the PRCS reported a median total income of $16,000 for both men and women. However, 2019 marked a turning point, with men's median income rising to $16,500, and women's median income rising slightly less, to $16,300. By 2022, the PRCS reports a median total income of $18,000 for men and $17,000 for women. In other words, as of 2022, women earned 94 cents for every dollar earned by men (in terms of median total income and according to PRCS data).

When delimiting PRCS data to salaries, as in our analysis of administrative data, we also observe the trend of a widening pay gap during the post-pandemic recovery. In this case, as of 2022, women earn 93 cents per every dollar earned by men. Our analysis of administrative data reflects that women earned only 90 cents for every dollar earned by men in 2022. In other words, the use of administrative data has not only confirmed the persistence and widening of the gender pay gap but has revealed the disparities are slightly worse than what available survey data suggested.

In sum, available survey data, as well as our analysis of administrative data both reveal persistent and widening wage disparities between men and women. Despite the post-pandemic economic recovery and nominal salary increases, women generally continue to earn less than men. This conclusion aligns with the literature previously reviewed, and also with findings from the World Economic Forum's Global Gender Gap Report 2023[6], which highlight the persistent global gender pay gap and suggest that structural and occupational factors potentially contribute to these disparities. In Puerto Rico's case, it also implies that the post-pandemic recovery has been considerably unequal, benefiting men significantly more than women.

It is also worth noting that unlike PRCS survey data, it is impossible to match available administrative data with information on the worker's hours worked, education, or experience. Using the 2022 5-year estimates, linear regression analysis of wages per hour controlling for years of schooling and experience, suggests gender disparities are higher than what is reflected when studying them unconditionally. In other words, the main findings of Segarra & Caraballo's analysis (2019) still hold true today. The fact that gender pay gaps have worsened according to the administrative data available is itself worrisome, but it is even more alarming when considering that these disparities would most likely be revealed to be even greater if one were to control for variables such as education and experience.

The analysis up to this point has considered the labor market as a whole. However, as will be discussed in subsequent sections, a more granular analysis by industry reveals significant variations within specific sectors.
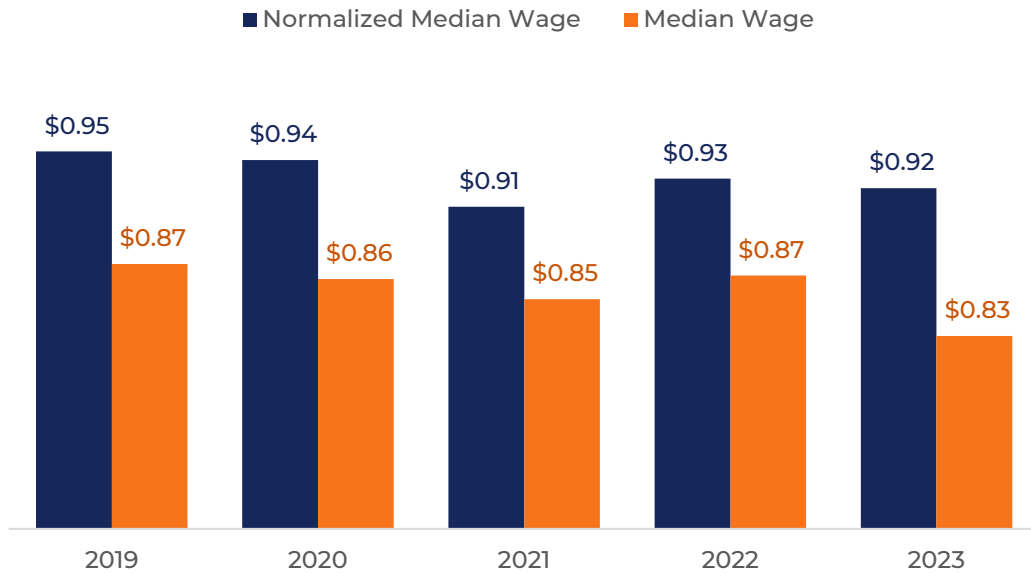
V.3.1. Normalizing Income Data

If the income data was normalized by quarter the large disparity between median wages for males and females is reduced. To normalize the data, only those that in each year that worked 4 quarters were compared, and those that worked less were converted to their annual equivalent. Although the wage gap is less after normalizing the data (see Figure 4), the trend is the same; the wage gap widened after the pandemic.

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[6] https://www.weforum.org/publications/global-gender-gap-report-2023/

Figure 4 – Median Wage Male vs Female

■ Normalized Median Wage　■ Median Wage

|	2019	2020	2021	2022	2023
Normalized Median Wage	$0.95	$0.94	$0.91	$0.93	$0.92
Median Wage	$0.87	$0.86	$0.85	$0.87	$0.83

Source: PR Department of Labor & Human Resources

V.4.　　Analysis by Income Strata

This section of the report analyzes at an aggregate level the potential proportional differences between men and women across different income segments or strata. Several income ranges were selected to identify how the distribution of employees within these strata has evolved over time, without considering industry-specific differences, i.e., at an aggregate level. This approach provides an overview of the general dynamics of wage distribution between genders in a broad context.

Figure 5 presents the distribution of gender by wage in 2023 for all industries. A deeper dive into each of these income brackets is presented in this section, but, as can be observed, the disparity of average and median wages among the genders is due to an underrepresentation of women in incomes of $40,000 and above.

Figure 5 – Distribution of Wages by Gender in 2023 (all industries)
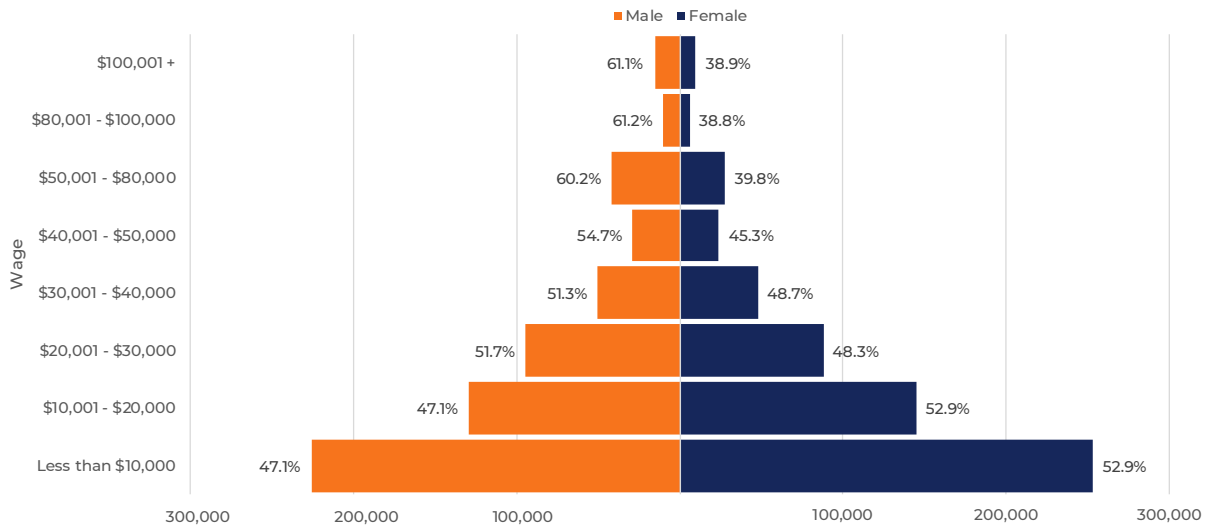
Source: PR Department of Labor & Human Resources

In this first example (Figure 6), the analysis focuses on the percentage of employed individuals earning less than $20,000 between 2019 and 2023. Consistent with previous observations of salary increases, after 2021, both groups experienced a decrease in employees earning less than $20,000 compared to the period from 2019 to 2021. However, the reduction (from 2019 to 2023) was more pronounced for men (7.3%) than for women (1.86%). Additionally, at an aggregate level, women consistently have a higher proportion of incomes below $20,000 compared to men across all years analyzed.

Figure 6 –Proportion of Employees with Incomes of $20,000 or less (all industries)
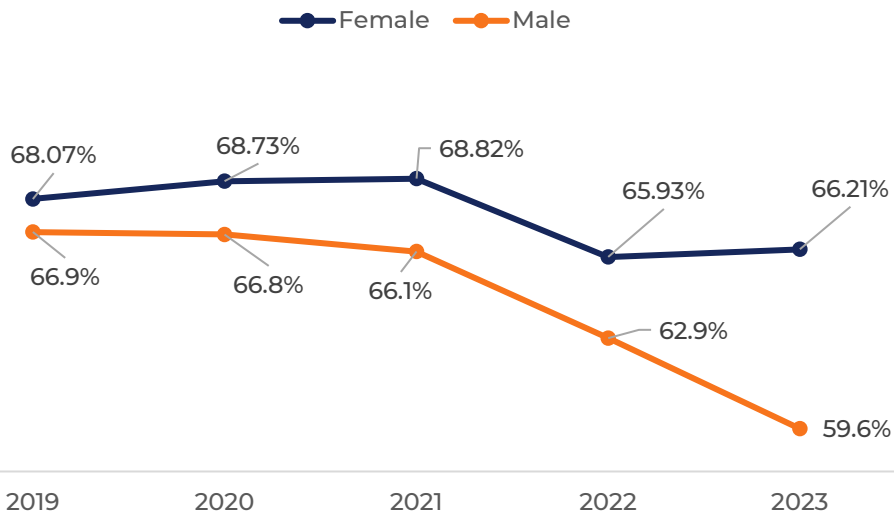
Source: PR Department of Labor & Human Resources

In this next segment, Figure 7 illustrates an upward trend for both men and women in the income segment of $50,001 to $100,000 from 2019 to 2023. In 2019, 7.02% of men and 4.63% of women fell within this income range, these figures increased to 8.6% and 5.6% respectively by 2023. However, men consistently outnumber women in this income bracket throughout the analyzed period. Although both groups have shown increases, the gap between them has widened, expanding from approximately 2.39 percentage points in 2019 to 3.05 percentage points in 2023.

*Figure 7 – Proportion of Employees with Incomes within $50,001 to $100,000 (all industries)*
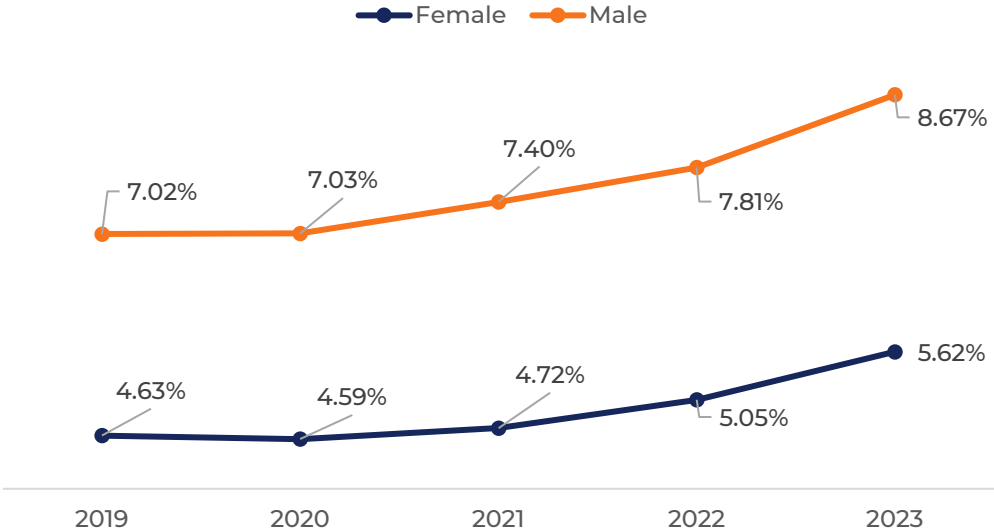
Source: PR Department of Labor & Human Resources

Figure 8 depicts an upward trend for both men and women in the income segment above $100,000 between 2019 and 2023. In 2019, 1.90% of men and 1.10% of women reported salaries above $100,000, proportions that increased to 2.6% and 1.6% respectively by 2023. This increase suggests an overall improvement in salary conditions for both genders, possibly due to an increase in the availability of well-paid roles.

However, the gap between men and women in this income segment has also widened, growing from a difference of 0.80 percentage points in 2019 to 1.00 percentage points in 2023. Moreover, these disparities are more pronounced in 2023 among employees earning over $150,000, where 0.5% of women compared to 1% of men fall into this category.

Figure 8 – Proportion of Employees with Incomes above $100,000 (all industries)
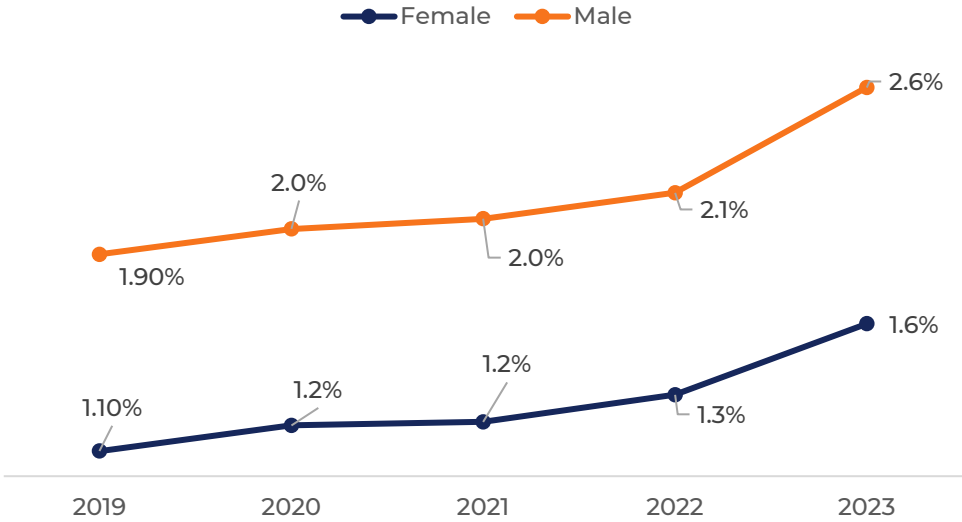
Source: PR Department of Labor & Human Resources

In sum, the income distribution by strata reveals that women are disproportionately represented in lower income brackets, while men dominate higher income brackets. By 2023, 8.6% of men earned between $50,001 to $100,000 compared to 5.6% of women, and 2.6% of men earned above $100,000 compared to 1.6% of women. This pattern suggests the presence of the glass ceiling effect, where women face barriers to advancing into higher-paying roles. This aligns with previous findings. Industry-specific data further confirms the extent of the glass ceiling in Puerto Rico. In the next section, we will explore how these trends vary across different sectors of the labor market.

VI.   Wage Disparity

VI.1.   General Overview

This section provides an analysis of employment distribution and median incomes between men and women across various industries in the year 2023. The collected data highlights gender disparities in workforce representation, median salaries, and wage gaps within each industry.

Industries with higher female representation include:

- "Health Care and Social Assistance", where women comprise 76.0% of the workforce, and
- "Educational Services", with 71.9%.

In contrast, industries with predominantly male employment include:

- "Mining, Quarrying, and Oil and Gas Extraction," with women representing only 11.0% of employment; and
- "Agriculture, Forestry, Fishing, and Hunting," with women representing 21.8%.

These findings indicate a clear segmentation of the labor market based on gender, with certain industries exhibiting significantly higher proportions of male or female workers.

Table 1 – Median Salary per Industry (2023)

Industry	Female		Male		Dif in Median Salary
	% of Employment	Median Salary	% of Employment	Median Salary	
Information	45.9%	$ 10,108	54.1%	$ 15,770	*56.0%*
Retail Trade	53.8%	$ 9,265	46.2%	$ 13,593	*46.7%*
Other Services (except Public Administration)	44.5%	$ 11,730	55.5%	$ 15,352	*30.9%*
Arts, Entertainment, and Recreation	43.6%	$ 9,159	56.4%	$ 11,695	*27.7%*
Professional, Scientific, and Technical Services	47.2%	$ 21,511	52.8%	$ 26,560	*23.5%*
Mining, Quarrying, and Oil and Gas Extraction	11.0%	$ 18,150	89.0%	$ 21,141	*16.5%*
Administrative and Support and Waste Management and Remediation Services	45.4%	$ 7,357	54.6%	$ 8,516	*15.7%*
Manufacturing	39.3%	$ 21,596	60.7%	$ 24,879	*15.2%*
Health Care and Social Assistance	76.0%	$ 17,636	24.0%	$ 20,156	*14.3%*
Accommodation and Food Services	52.6%	$ 5,768	47.4%	$ 6,554	*13.6%*
Utilities	23.5%	$ 34,490	76.5%	$ 38,449	*11.5%*
Transportation and Warehousing	25.5%	$ 16,395	74.5%	$ 18,207	*11.1%*
Finance and Insurance	64.8%	$ 33,981	35.2%	$ 37,476	*10.3%*
Public Administration	47.1%	$ 19,368	52.9%	$ 20,730	*7.0%*
Agriculture, Forestry, Fishing and Hunting	21.8%	$ 7,378	78.2%	$ 7,701	*4.4%*
Educational Services	71.9%	$ 10,448	28.1%	$ 10,903	*4.4%*
Management of Companies and Enterprises	49.0%	$ 19,207	51.0%	$ 19,006	*-1.0%*
Wholesale Trade	33.2%	$ 25,315	66.8%	$ 24,197	*-4.4%*
Real Estate and Rental and Leasing	40.4%	$ 18,314	59.6%	$ 17,438	*-4.8%*
Construction	13.3%	$ 14,675	86.7%	$ 12,938	*-11.8%*
Unknown	52.5%	$ 9,870	47.5%	$ 11,261	*14.1%*
Total	50.3%	$ 12,716	49.7%	$ 15,577	

Source: Puerto Rico Department of Labor and Human Resources, ABEXUS (2023)

As can be observed in Table 1, the wage gap in median wages between men and women varies notably across industries. For example, in the Information sector, men report a median salary 56.0% higher than women, earning $15,770 compared to $10,108, respectively. Similarly, in "Retail Trade", men earn a median salary of $13,593, whereas women earn $9,265, resulting in a gap of 46.7%. In industries like "Professional, Scientific, and Technical Services," as well as "Mining, Quarrying, and Oil and Gas Extraction," men also earn considerably higher median salaries than women, with disparities of 23.5% and 16.5%, respectively. Conversely, some industries demonstrate a narrower gender wage gap or even favor women slightly, such as "Management of Companies and Enterprises" and "Wholesale Trade", where women earn median salaries marginally higher than men (1.0% and 4.4%, respectively).

Moreover, examining the relationship between wage gaps and gender workforce representation reveals intriguing patterns. In industries with high female representation, such as "Health Care and Social Assistance," -despite comprising 76.0% of the workforce-, women report median salaries 14.3% lower than their male counterparts. This underscores persistent wage disparities despite women's numerical dominance in these sectors. This could be due to an underrepresentation of women in administrative and/or management positions that typically offer a higher pay.

Conversely, in industries with predominantly male employment, such as "Mining, Quarrying, and Oil and Gas Extraction," where women constitute only 11.0% of the workforce, the wage gap stands at 16.5%. Here, the lower female representation coincides with significant wage disparities, highlighting potential systemic barriers affecting both workforce participation and wage.

Additionally, there are instances across four industries where women earn higher median salaries than men:

- "Management of Companies and Enterprises" (female median wage 1% higher),
- "Wholesale Trade" (4.4%),
- "Real Estate and Rental and Leasing" (4.8%), and
- Construction (11.8%).

In all four cases, women are less represented within the industry's workforce. Women represented 49% of the "Management of Companies and Enterprises" workforce, 33.2% of "Wholesale Trade," 40.4% of "Real Estate and Rental and Leasing," and 13.3% of Construction. When considering the characteristics of these industries in the context of cultural gender roles, one possible explanation is that women within some of these sectors tend to mostly occupy white collar positions.

For example, in the construction industry, the few women who are employed may be more likely to hold administrative or managerial roles rather than performing labor-intensive tasks. A tendency for women to occupy higher-paying white-collar positions within these industries, despite their lower overall representation, may help explain

some of the observed wage differences. In addition, the administrative data utilized does not allow controlling for variables such as education or experience. Given the literature within and outside Puerto Rico, it is very likely that when controlling for such variables, the gender pay gap against women would resurface in these four industries as well.

Significant wage gaps were also identified in "Information," "Retail Trade" and "Arts, Entertainment and Recreation." In these sectors, men consistently earn higher median salaries than women, reflecting broader gender disparities in compensation despite varying levels of female participation in the workforce. Another industry of particular importance is "Healthcare and Social Assistance", where the majority of those working were women, but salaries for women were still lower on average.

In the following sections the analysis will focus on industries where the differences in median salaries between men and women are most pronounced. This exercise will allow us to examine the distribution of employment between men and women across different salary ranges.

VI.2.   Industry Specific

VI.2.1. Healthcare and Social Assistance Sector (NAICS 62)

As can be observed in Figure 9, women represent by far the largest portion of the healthcare workforce at 76%. This is true in almost every income level except for those making above $100,000. Given the above, the median salary of male workers is 14.3% higher than the median wage of women. This could be due to an underrepresentation of women in administrative and/or management positions that typically offer a higher pay.

- Female Participation: 76.0%
- Female Median Salary: $17,636
- Male Participation: 24.0%
- Male Median Salary: $20,156
- Female median cents per dollar of median Male wage: $0.87

Figure 9 – Distribution of Wages by Gender in the Healthcare & Social Assistance Sector (2023)
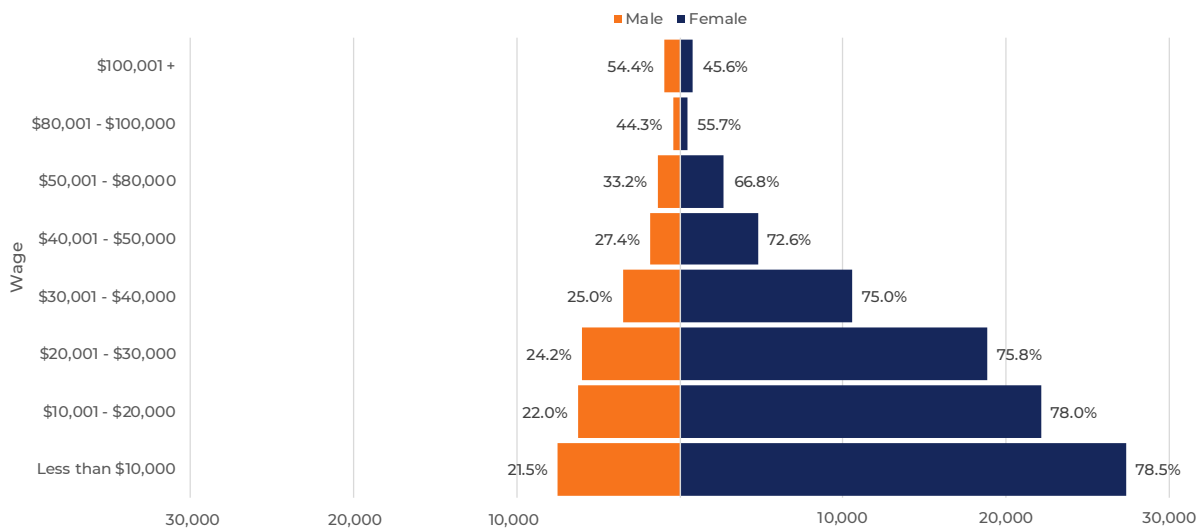
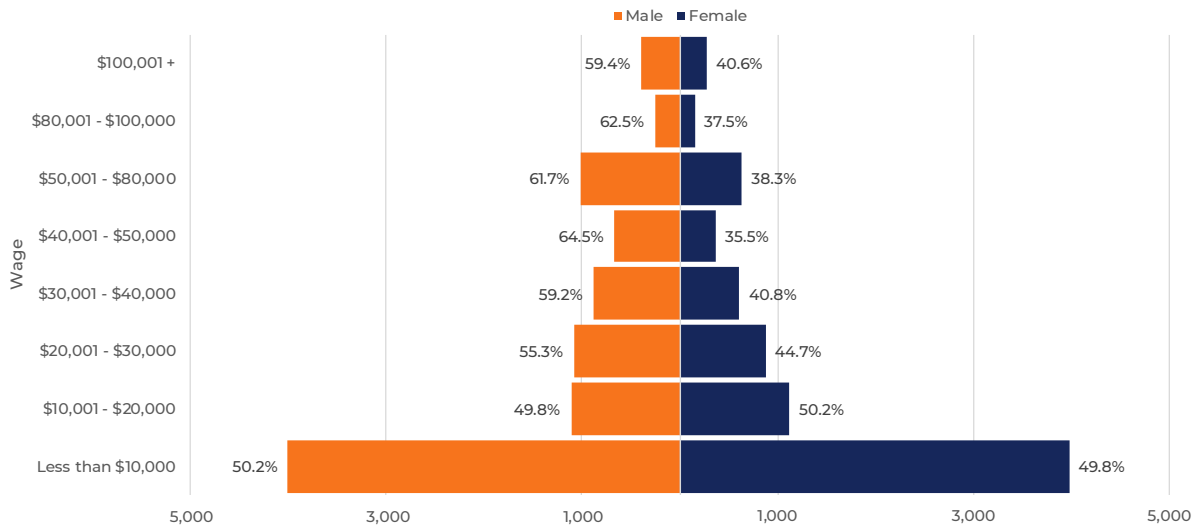Source: PR Department of Labor & Human Resources

VI.2.2. Information Sector (NAICS 51)

As shown below, in the Information sector, the median salary for men significantly exceeds that of women, by a significant 56.0%, despite women comprising a relatively high participation rate of 45.9%. In other words, based on median salaries, women earned 64 cents per every dollar earned by men.

- Female Participation: 45.9%
- Female Median Salary: $10,108
- Male Participation: 54.1%
- Male Median Salary: $15,770
- Female median cents per dollar of median Male wage: $0.64

Figure 10 presents the gender-based salary distribution in the Information sector, segmented across different income ranges. Male workers outnumber female workers in almost every income level.

Figure 10 – Salary Distribution by Gender (Information Sector – NAICS 51)

Source: PR Department of Labor & Human Resources

In the income ranges between $50,001 and $80,000, it is notable that men exhibit significantly higher representation than women. This trend underscores a notable disparity at these salary levels, where the gender gap is prominently visible.

As income levels rise, this disparity persists but shows a slight reduction in those making above $100,000. Here, while men continue to have more representation, the differences between genders are less pronounced compared to lower salary brackets.

Overall, the trend indicates male predominance across almost all top salary ranges in the Information sector. The differences are most pronounced in the salary brackets of $40,001 to $50,000 and $50,001 to $80,000.

VI.2.3. Retail Trade (NAICS 44-45)

In the Retail sector, women comprise 53.8% of the workforce, while men make up 46.2%, indicating a sector where most salaried jobs are held by women. Despite this higher female representation, women earn a median salary of $9,265, whereas men earn $13,593, reflecting a 46.7% difference in median salaries. In other words, based on median salaries, women earned 68 cents per every dollar earned by men.

- Female Participation: 53.8%
- Female Median Salary: $9,265
- Male Participation: 46.2%
- Male Median Salary: $13,593
- Female median cents per dollar of median Male wage: $0.68

Figure 11 illustrates the gender-based salary distribution in the Retail sector. This segmentation also reveals gender differences in the highest salary levels.

Figure 11 – Salary Distribution by Gender (Retail Trade – NAICS 44-45)

Source: PR Department of Labor & Human Resources
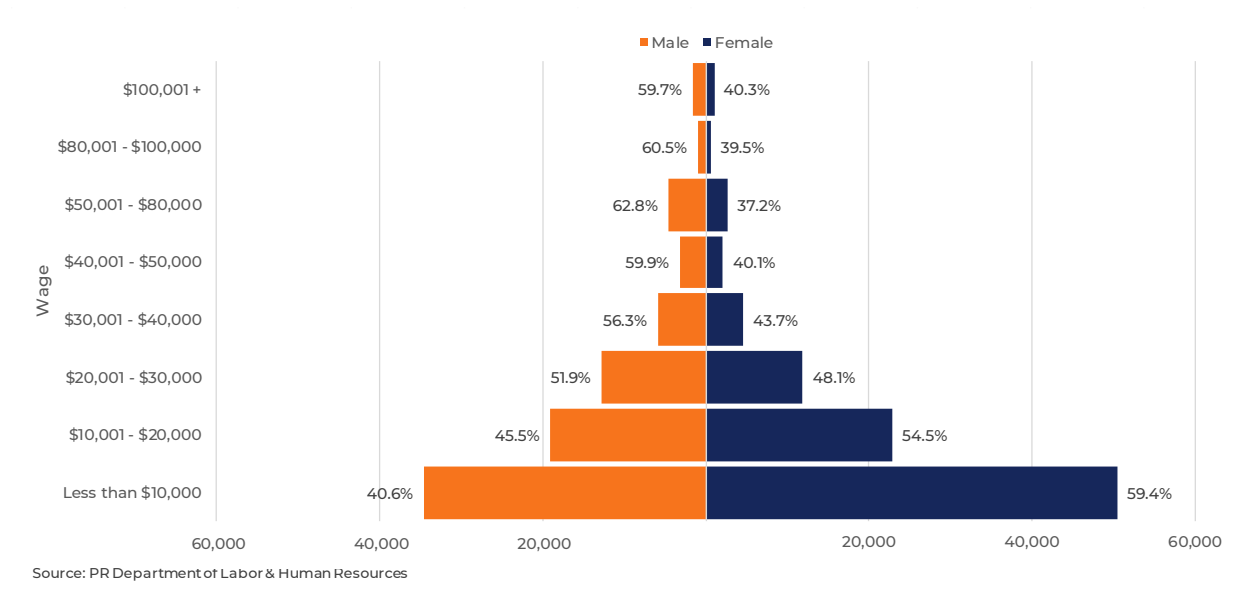
In the salary range of $50,001 to $80,000, there is a notable gap, with a higher proportion of men compared to women. This disparity persists for higher income levels all the way to those making above $100,000.

Women make up the largest portion of those with wages below $20,000, and almost half of those making $20,001-$30,000. The vast majority of people at this income level are

working at or near the minimum wage. Meaning women are underrepresented in the higher incomes, and overrepresented in the lower incomes.

VI.2.4. Professional, Scientific, and Technical Services (NAICS 54)

In the Professional, Scientific, and Technical Services sector, women constitute 47.2% of the workforce, while men make up 52.8%. Despite this relatively balanced representation, women earn a median salary of $21,511 compared to $26,560 for men, reflecting a 23.5% difference. In other words, based on median salaries, women earned 81 cents per every dollar earned by men. This wage gap suggests that women, although well-represented in the sector, don't necessarily have equal access to the highest-paying roles.

- Female Participation: 47.2%
- Female Median Salary: $21,511
- Male Participation: 52.8%
- Male Median Salary: $26,560
- Female median cents per dollar of median Male wage: $0.81

Figure 12 – Salary Distribution by Gender (Professional, Scientific, and Technical Services (NAICS 54))
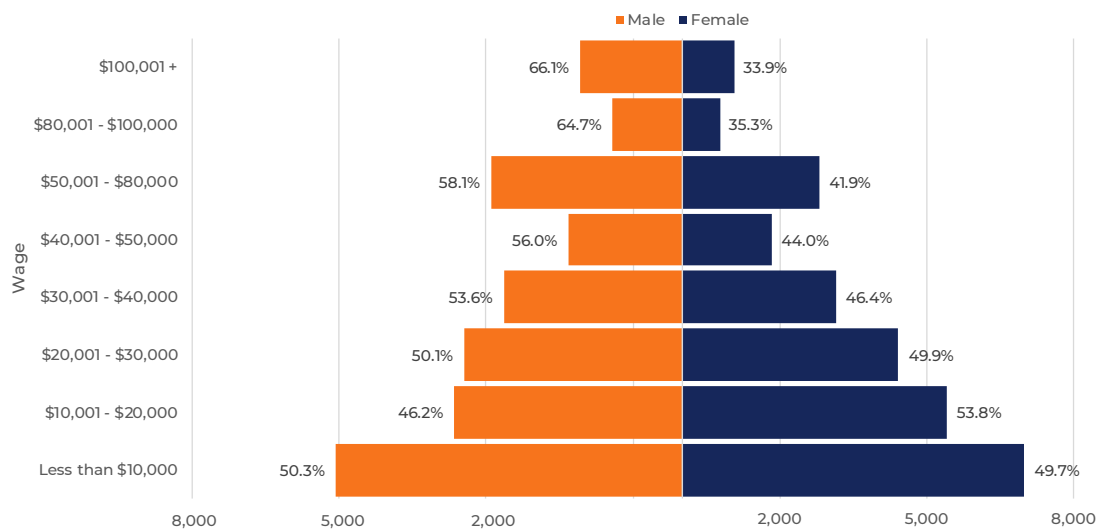
Source: PR Department of Labor & Human Resources

As observed, in the income ranges of $80,001 to $100,000, and $100,001 or above, there is a notable gap with a higher proportion of men than women. This disparity is particularly pronounced in these segments.

As with retail trade, the distribution between men and women at incomes at or below $40,000 is relatively even. But the disparity quickly grows, with more men with higher wages in all income brackets above $40,000. This is particularly pronounced in those earning above $100,000.

VI.2.5. Wholesale Trade Sector (NAICS 42)

The wholesale sector is one of the few where even if women represent only a small portion of the workforce, the median and the mean income of females is larger than for males.

- Female Participation: 33.2%
- Female Median Salary: $25,315
- Male Participation: 66.8%
- Male Median Salary: $24,197
- Female median cents per dollar of median Male wage: $1.05

As can be observed in Figure 13, men represent a much higher proportion of than women across all income levels. Yet, because the proportion of men to women diminishes as incomes increase, both the median and mean wages of women in this sector are higher than for men. This sector is an excellent selection for a deeper dive and case study as to why this has taken place. Particularly considering that this is only 1 of 3 sectors were women earn more than men in 2023.

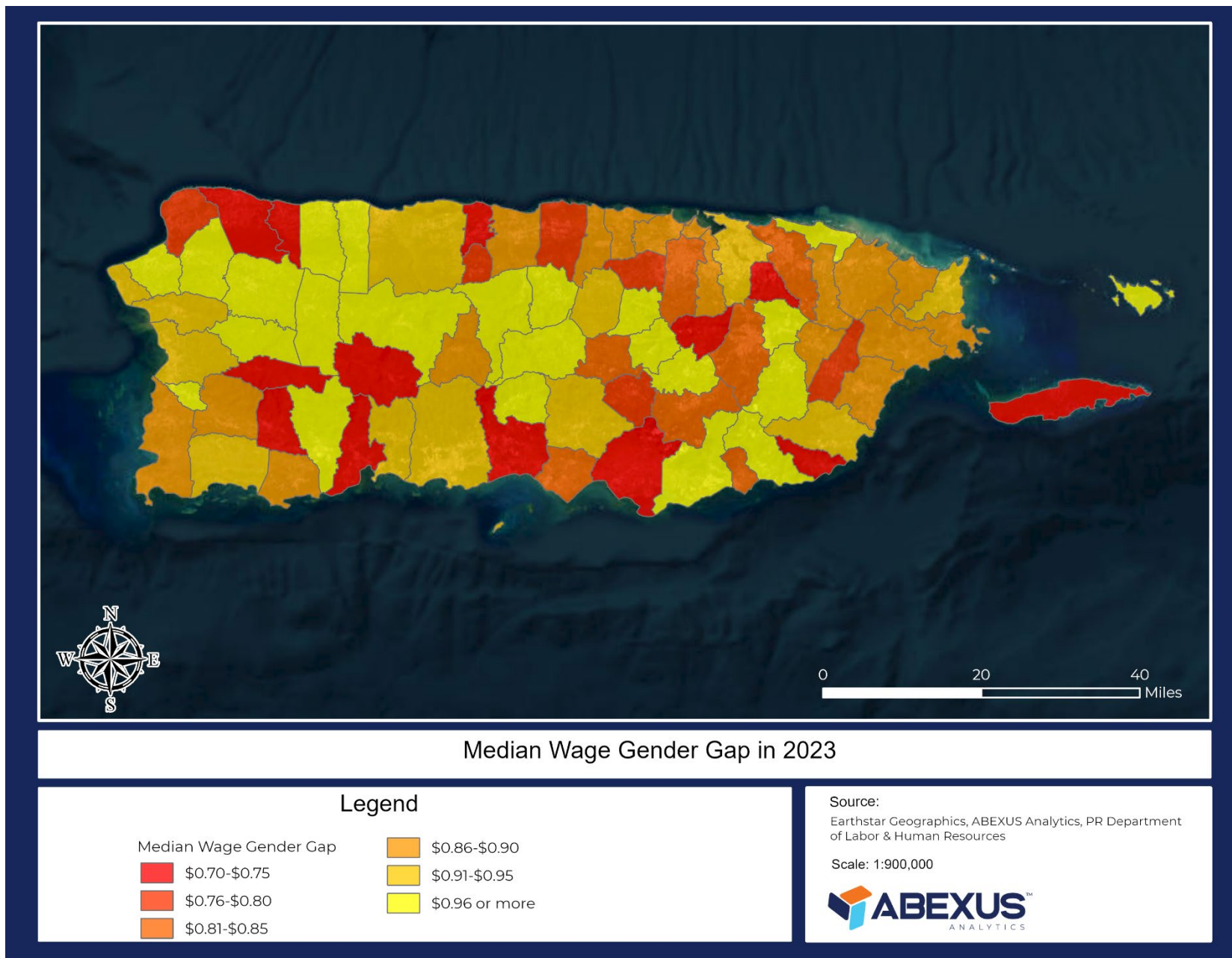*Figure 13 – Salary Distribution by Gender in Wholesale Trade Sector in 2023 (NAICS 42)*
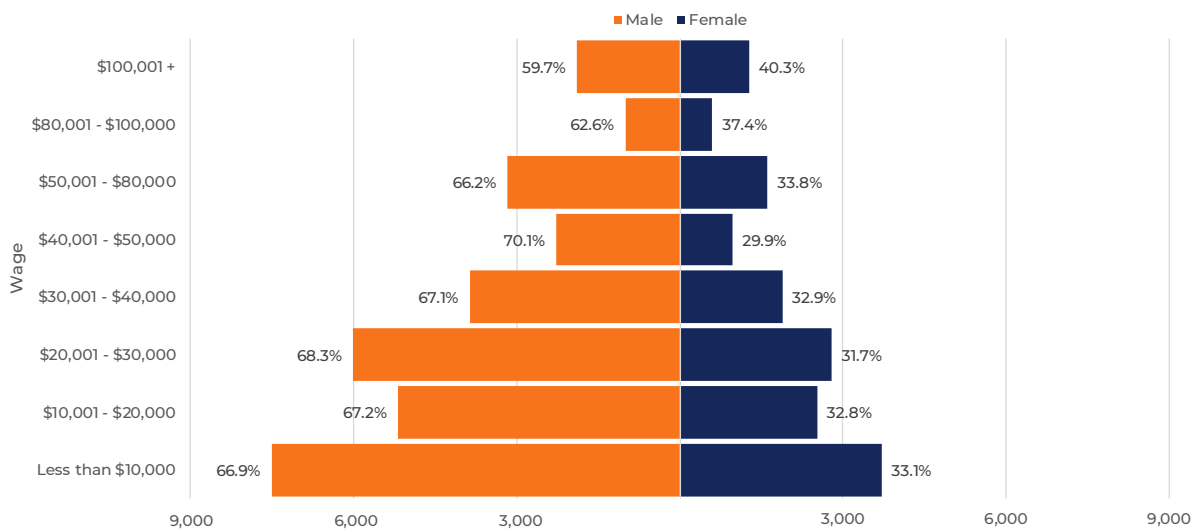
Source: PR Department of Labor & Human Resources

VI.3.   Gender Wage Gap by Municipality

In Figure 14 the median wage gap by municipality in 2023 is presented. While San Juan has a wage gap of $0.90-$0.95 the center of the Island has the smallest wage gaps. This is likely related to the lower incomes paid in these municipalities, since large portions of these workers receive the minimum wage, among salaried employees there is little difference in wages. This could change if self-employed are also considered.

Figure 14 – Gender Wage Gap (Median in 2023)

Median Wage Gender Gap in 2023

Legend

Median Wage Gender Gap

- $0.70-$0.75
- $0.76-$0.80
- $0.81-$0.85
- $0.86-$0.90
- $0.91-$0.95
- $0.96 or more

Source:
Earthstar Geographics, ABEXUS Analytics, PR Department of Labor & Human Resources

Scale: 1:900,000

ABEXUS ANALYTICS

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VII.   Panel Data Analysis

An argument can be made that the previous analysis fails to control for new entrants in the labor market, as well as structural changes. For this reason, a panel dataset was utilized to study the same individuals across the 2019-2023 period. The individuals in this analysis needed to meet three criteria, have worked in 2019, have worked in 2023, and earn more than the yearly minimum wage in those years[7]. Panel data is simply looking at the same variables for various individuals across an even interval of time.

Under these assumptions, the final dataset was 310,104 individuals, out of which 45.8% were female and 54.2% male. In Figure 15 the distribution of individuals by gender and number of jobs is presented. Consistently males had more jobs between 2019 and 2023, this is also true across all income levels before and after the pandemic.

Figure 15 – Distribution of Individuals by Gender and Number of Jobs Between 2019-2023
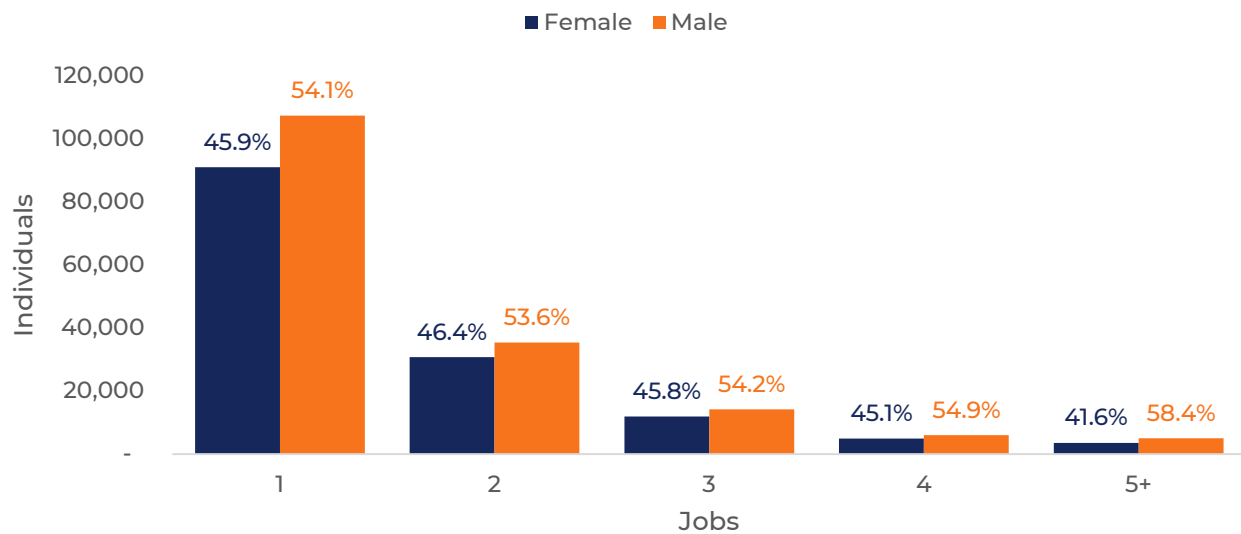
Source: PR Department of Labor & Human Resources

When selecting the population for this time-series analysis, it was found that more male workers met the criteria than women. This potentially means that during the pandemic more women spent time outside the workforce than men.

VII.1.   Wage Growth 2019-2023

For the workers that had relatively consistent employment between 2019 and 2023, male workers overrepresented females in every growth category (see Figure 16) except for those that increase more than 30%. In that category (the largest) the women slightly outnumbered the men.

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[7] The minimum wage in 2019 for a full-time employee (35 hours) was $13,195, while in 2023 it would have been $16,380 (6-months at $8.50 an hour and 6-months at $9.50 an hour).

Figure 16 – Wage Growth by Gender 2019-2023

■ Male ■ Female
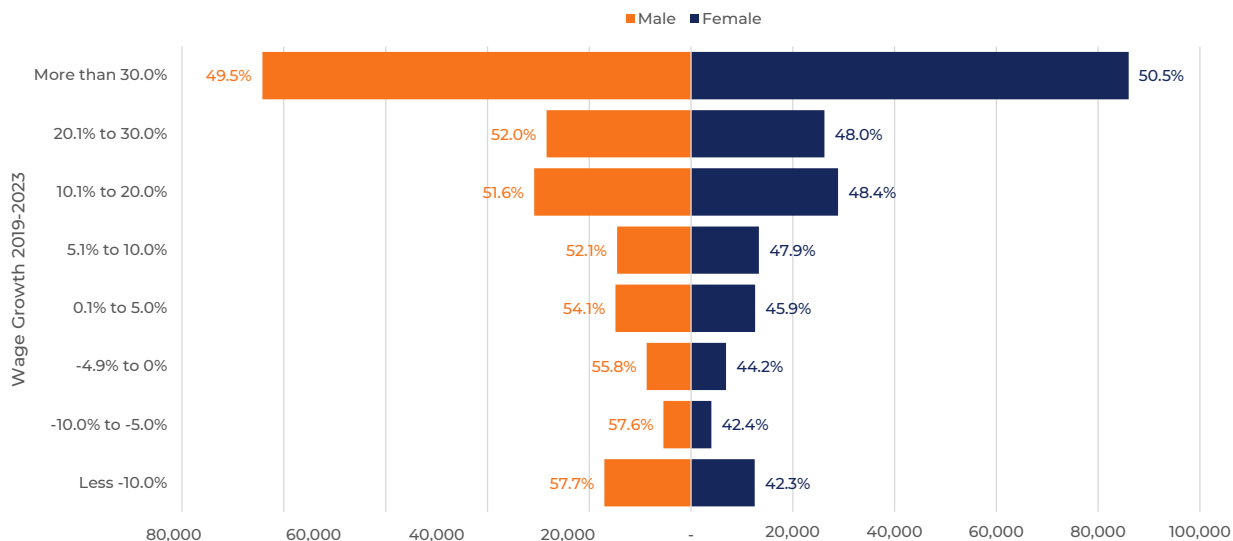
Source: PR Department of Labor & Human Resources

In Table 2 the population in the dataset is presented along with the general characteristics. As mentioned, more men met the criteria of having worked in 2019 and 2023. Men also had a higher wage in 2019 and in 2023. For all the statistics reported in Table 2 a two-tailed t-test was used to conclude that all the differences are statistically significant.

By isolating those that worked consistently between 2019 and 2023, one can better control for external factors that could affect wages. The average wage of women grew at a higher rate than men, even though they had slightly lower number of quarters worked, and number of jobs.

The number of quarters refers to the 4 quarters available to work in each year for the five years between 2019 and 2023 (max number of quarters is 20). The number of jobs is the number of different employers they had during the five-year span.

Table 2 – Population within the Dataset

Gender*	Female	Male
Population	142,172	167,932
Average Wage -- 2019	$36,860	$41,335
Average Wage -- 2023	$46,113	$50,962
Number of jobs	1.6	1.7
Wage Growth 2019-2023	25.1%	23.3%
Quarters Worked 2019-2023	19.3	19.7

Source: Department of Labor & Human Resources

VIII. Summary Findings

The increase in female labor market participation is one of the most notable trends observed between 2017 and 2023. Female labor participation rose from approximately 33% to 38%, while male labor participation increased from 48% to 51%. This rise in female participation is critical for economic growth and equity, underscoring the need for policies that support women's continued engagement in the workforce, such as improved access to childcare, flexible work arrangements, and robust anti-discrimination laws.

However, our analysis has shown that the economic recovery post-COVID-19 has not benefited men and women equally. Men have disproportionately benefited from the economic recovery. Average wages for men rose 15% from 2019 to 2023, compared to only 9% for women. Similarly, median wages for men increased by 15%, whereas for women, the increase was a mere 2%. In 2023, women earned 82 cents for every dollar earned by men in terms of median wages, down from 92 cents in 2019. Therefore, the gender pay gap in Puerto Rico has not only persisted, but has actually widened.

Women face substantial pay disparities across most industries, regardless of whether they are over, or underrepresented in those fields. Even in sectors with high female representation, women earn significantly less than men, and the gap becomes more pronounced as salaries increase. This pervasive inequality underscores the systemic barriers that prevent women from achieving equitable compensation and advancing into higher-paying positions. In other words, the analysis reveals a persistent glass ceiling effect, where women face barriers to advancing into higher-paying roles. This is particularly evident in the income strata analysis, which shows that the gender gaps widen significantly at higher income levels.

However, the available data and the above analysis are not sufficient to provide determining factors for this wage disparity, merely that they exist. For this reason, the Puerto Rico Department of Labor & Human Resources could develop initiatives to enhance its surveys, or data gathering systems to provide the necessary data to both measure the wage gap and determine factors that are causing it.

To address these disparities, several policy measures are recommended by the literature. Policies that provide adequate childcare and promote flexible work arrangements are crucial for supporting women's continued labor market participation, ensuring that women have equal opportunities for advancement, and mitigating the glass ceiling effect. Further research should also be conducted into how flexible work arrangements also impact wages, promotions, and long-term income growth. As was observed from the data, underrepresentation by women in the higher earning positions continues to be the main factor in the wide differences in median and in mean earnings. Requiring firms to implement transparent hiring and promotion practices would also contribute to this end.

VIII.1.   Potential Policy Paths

Based on our main empirical findings and review of the academic literature, the following conditions should be prioritized to improve the accuracy of any gender pay gap analysis in the future and reduce the effective pay gap:

1. The Puerto Rico Department of Labor should consider the development of data gathering mechanisms at a firm level, in order to capture detailed information about their employees[8]. This should encompass age, educational attainment, hours worked, work experience, occupation, industry, job level, employment type, parental status, tenure with employer, bonuses and other compensation, and average pay levels broken down by sex, for categories of employees performing the same work or work of equal value. The agency should facilitate the process for employers by providing a template or online submission platform.

    i.   This should be accompanied by a system that automatically calculates employer-level gender pay gaps.

    ii. The Department of Labor could use the collected data to publish an annual Gender Pay Gap Report and create public resources available online that compile aggregate pay data across industries such that employees are able to benchmark their pay against broader standards.

2. Economic literature recognizes that "pay transparency" mechanisms reduces wage disparities and tend to reduce information asymmetries.

3. Support for childcare and gender-neutral parental leave. These include support for early child development programs, after-school programs, elderly care programs and flexible work arrangements.

4. Promote women's continued labor market participation while ensuring equal opportunities for advancement.

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[8] Some of the basic data could be incorporated into the quarterly findings.

IX. Moving Forward – Measuring & Analyzing the Wage Gap

The PR Department of Labor & Human Resources (DLHR) needs to consistently measure the wage gap to determine the effectiveness of public policy. This would also serve as a way for the DLHR to also identify potential causes when the wage gap widens, as was observed during the pandemic. Meaning the DLHR can move beyond simply measuring the wage gap and begin to offer potential factors that are responsible for the gap.

IX.1. Unexplained Factors Behind the Pay Gap

While econometric modelling has been able to estimate the proportion of the gender pay gap that is unexplained, there remains much to be learned about the nature of this unknown portion. In Canada, for example, it has been estimated that, as of 2018, almost two-thirds of the gender wage gap remained unexplained after accounting for typical known factors (such as educational attainment, job characteristics, and the concentration of men versus women in higher-paying occupations or industries) (Pelletier, Patterson, & Moyser, 2019). It is frequently assumed to be a measure of the extent of gender discrimination by employers, however, the true nature of this unexplained portion may include a consequence of either compensating wage differentials or unmeasured productivity (Blau & Kahn, 2017).

Survey questions related to labor market activity and intentions may be able to shed light on the gender pay gap if the content of these surveys is consistent with the theories and evidence presented in the economic literature, as to the factors behind the unexplained gap in pay between men and women.

IX.1.1. Possible Areas of Focus for Future Surveys

Several important themes exist in the economic literature as possible reasons behind the gender wage gap. These may be useful to identifying areas of focus in designing survey questions geared to uncover the prevalence of certain factors which are known or strongly suspected to be associated with the pay gap. A Gender Equality Survey from the Nevada Commission for Women (NCW) (Nevada Commission for Women, 2019) contains questions which investigate some of these themes and relevant examples will be part of the following discussion.

Workforce interruptions are noted in the literature as a potential factor contributing to the gender pay gap. Although the 'motherhood penalty' in the labor market is well established in the literature as contributing to the wage gap, knowing the presence of other long-term leaves (such as a medical leave) would be useful. A strand of literature dating back to the 1970s underlines the importance of labor market attachment on wage outcomes between men and women. Interruptions in the continuity of work are expected to reduce the opportunities for workplace training for women and lead to the

depreciation of human capital which in turn should lead to lower wages (Blau & Kahn, 2017).

Related to the above are obstacles preventing women from either entering the labour force at all or leading to women working part-time instead of full-time hours. Gender-specific individual constraints are discussed in the literature as barriers to the economic success of women compared with men (Kabeer, 2012). The NCW's Gender Equality Survey includes a question to identify obstacles keeping women from working (Nevada Commission for Women, 2019).

It would also be useful to understand if women surveyed would prefer to be working more hours, fewer hours, or the same number of hours per week. The survey design could determine the prevalence of women working part-time voluntarily and their reasons for doing so. Childcare is identified in the literature as a possible reason (Blau & Kahn, 2017). The NCW survey includes a question asking whether the respondent is independently wealthy or not, which would likely account for some women not participating in the labour force (Nevada Commission for Women, 2019).

The degree to which women require flexibility in the scheduling of hours is hypothesized to impact pay differences between men and women. The value of long hours may be prized in certain occupations, and the cost to the employer of providing flexibility may vary by occupation (Goldin, 2014). The degree to which women require flexible scheduling from their employer may be a useful survey question.

Flexibility requirements in scheduling may be due to the challenges of balancing work responsibilities and home responsibilities (such as childcare, housework, and elder care). It follows from the established literature on the subject that unpaid work performed disproportionately by women created broad social benefits, yet the price for doing that work is in the form of lower earnings, relative to men (Moyser, 2019, p. 10). A related issue is the hypothesis that women are more likely to quit their jobs for family related reasons (and possibly transitioning out of the labour market entirely), while men are more likely to do so for job-related reasons (Blau & Kahn, 2017).

Therefore, a survey question focused on the reason for quitting an individual's most recent job may be beneficial. Access and afford ability of early childhood education and care often influences the decision of one or both parents to work or exit the labor force (OECD, 2023). It may be useful to determine what proportion of women find securing affordable childcare a challenge.

Unmet training needs are cited in the literature as a possible explanation for part of the gender pay gap (Blau & Kahn, 2017). A 2021 Statistics Canada study, using data from the Canadian Social Survey, found that women were less likely than men to receive paid formal training from their employer and more likely to pay for formal training themselves. This suggests that women face higher financial burdens than men when attempting to gain skills and raise human capital following their entry into the labor market (Deng, 2021).

It would be useful to survey if the workforce have any current unfulfilled education or training needs or wants that relate to their current job, and if their employer is offering paid training. It would be important to know if the training is mandatory or not (either by the employer or a regulatory licenced body) and if there are barriers cited in the way of training (e.g., out-of-pocket expenses, or time constraints due to work or family life).

Gender gaps in experiential learning may also be an important contributor to the gender pay gap. An OECD discussion paper points to the fact women are under-represented in fields such as construction, manufacturing and engineering in many countries – well paid fields in which apprenticeships are common (OECD, 2023). In Canada, graduates from post-secondary institutions who participate in co-op programs in which students gain on the job experience during their education earn, on average, significantly more than those who do not participate (Wynoch, 2020). It may be helpful to know the extent to which women have participated in such programs (apprenticeships, co-op placements and internships).

To gain insight into the extent to which workplace discrimination is an issue behind the gender pay gap in Puerto Rico, it would be useful to know the degree to which women feel discriminated against at work, and how that compares to men. Evidence pointing to a relationship between discriminatory social attitudes and pay gaps (both gender and racial) exists in the literature (Janssen, Sartore, & Backes-Gellner, 2014). The NCW's Gender Equality survey specifically asks if men and women are treated equally at their current workplace, and if they feel their gender has played a role in "missing out on a raise, promotion, or chance to get ahead" (Nevada Commission for Women, 2019, p. 20). It may also be helpful to ask a similar question about race.

Survey questions dealing with employees experiencing harassment in general, and sexual harassment in particular may yield important pieces of information regarding the gender wage gap. A Swedish study, published in 2022, discusses the link between sexual harassment and labor market inequality – particularly the gender wage gap. The authors' calculations attribute about one-tenth of the raw gender wage gap to sexual harassment. Furthermore, the prevalence of sexual harassment contributes to gender segregation across workplaces, and is a particular concern when women are underrepresented in male-dominated, higher- paying occupations as it provides a disincentive for women to work in these occupations (Folke & Rickne, 2022).

A 2008 study in Bangladesh attempted to identify factors which led to the presence of a 'glass ceiling' for women in that country – in other words a social barrier preventing women from advancing in their careers compared to men. A questionnaire using a Likert scale was employed by the researchers to survey female employees across different industries in Bangladesh. Information was sought according to five hypothesized factors. 'Management perception' – relating to a bias of management towards not hiring women in senior positions and not assigning women to high priority or high visibility projects. 'Work environment' – including a lack of opportunity for women to advance to senior positions and network effectively. 'Work-life conflict' – such as working long hours and

taking time off for family responsibilities. 'Organizational policy' – including performance management systems that favor men and a belief in the organization that women are at risk of leaving to start families – as well as 'sexual harassment' (Afza & Newaz, 2008).

IX.2.   Recommended Approach

The previously mentioned suggested surveys could take time to implement and begin collecting data, depending on the survey design it could also be difficult to merge the findings with other labor-related data already collected by the DLHR. For this reason, an ideal approach would be to incorporate the suggested questions as part of surveys that are currently carried out by the DLHR. These include the occupational survey (OEWS), the household survey (LAUS), and the establishment survey (QCEW & CES).

These wage gap surveys could be executed as a separate annex that accompanies the current survey, or as questions incorporated directly into the current surveys. This would allow for data to be collected quickly, analyzed, and published. An additional benefit of this approach is that the new data will be easily related to industry, geography, and wages. Meaning a greater granularity when analyzing the results.

The questions should be divided between those for the employer and those for the employee and assigned to the appropriate survey, LAUS for employee and OEWS or QCEW for the employer related questions.

Integrated Survey

In the OEWS questions related to:

- experience of the employee,
- years at the employment, and
- additional benefits offered (estimate of benefit worth) should be included.

   *For which occupations are salaries available to employees, this serves as a way to measure transparency.

In the LAUS several variables and questions could be considered, such as:

- if the person has reduced hours compared to a previous period,
- additional follow-up questions related to the reason.
- Did the hours worked decline because of the employer or
- did the hours worked decline because of the employee.

In the QCEW key additional questions include:

- Sexual and/or other types of harassment have been reported in the past year.
- Questions about transparency such as, do you report salaries?
- If so for what percentage of jobs?

Independent Survey

If a stand-alone survey is to be conducted, it should be, -at least in the first iteration-, directed at the employers. In it questions related to transparency of salaries and benefits, distribution of employment by gender and by occupation should be included. One of the findings of this report has been the discrepancy in wages by sex among the highest earners, it would be ideal to determine if higher earners have more or less transparency regarding their peers.

This survey should also outline years of experience by worker. Given the scope of the survey, a pilot program would be recommended to finetune the wording and structure to minimize the time to complete and ensure that no undue burden is placed on small businesses when completing. The survey pilot programs should be conducted with small, medium, and large firms to estimate time to complete, cost for the company, and potential compliance rates. Below is a brief blueprint of an independent survey that could be used for the pilot program. Keep in mind that all questions will have to be segregated by gender, thus, such variable will be incorporated across the whole survey.

Sample Questions

1. Company Name
2. Years of Operations
3. Industry code (NAICS)
4. Location (Municipality)
5. Number of full-time and
6. Number of part-time employees
7. Distribution of ownership by gender (if applicable)
8. Number of employees by occupation
9. Number of employees by gender
10. Number of employees by wage
11. Number of employees by hours worked
12. Number of employees by years with company
13. Number of employees by total years of experience
14. Number of employees by additional benefits (with estimated cost)
15. Number of employees by educational attainment

Table 3 – Example of Question Structure

Employee	Gender	Average Weekly Wage	Average Hours worked	Years with Corporation	Aditional Benefits	Cost of Additional Benefits per week	Educational Attainment
1	Female	$600	40	3	Work from home	$30	MA
2	Male	$750	40	2	Work from home	$30	MS
3	Other	$600	40	1	None	$0	BA

16. Are wages publicly available for all occupations?
    a. If no, for which occupations aren't wages transparent?
17. Has the company undertaken any review or audit of any discriminatory practices?
18. Has the company completed the certification of compliance with Rule 9162 (DTRH)
19. Number of sexual harassment reports/claims in the past year?
20. Measures taken to resolve the reports/claims of sexual harassment

X.   Bibliography

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