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Who are Central Banks?

Gender, Human Resources, and Central Banking

Mariarosaria Comunale, Petra de Bruxelles, Kalpana Kochhar, Juliette Raskauskas, and D. Filiz Unsal

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ABSTRACT: Central banks, as the epitome of the economics profession and the main paragon of public institutions, can reveal key insights into gender patterns. We create a novel multidimensional survey directed at eight central banks in advanced economies (G7 national central banks and the European Central Bank), covering several aspects of gender, such as women's participation at different seniority levels, employment trends, and human resources practices. These elements are summarized in a new comprehensive index of gender equality—Human Resources Gender Index (HRGI). We show that these central banks have room for improvement in the inclusion of women in economics professions, managerial positions, and with full time contracts. Women in central banking also face a gender pay gap. In comparison, International Financial Institutions (the International Monetary Fund, the World Bank Group, and the Organization for Economic Co-operation and Development) perform better in terms of gender equality. The HRGI index, hiring and promotion of women, and their contract types are associated with output and credit gaps, thus being of macro-critical importance. In return, some country characteristics can be related to gender equality, such as women in high-level positions, government effectiveness, and corruption.

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WORKING PAPERS

Who are Central Banks?

Gender, Human Resources, and Central Banking

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1. Introduction

Central banks are at the core of the economics profession, form a vital part of the training of economists worldwide, and are the main paragon of public institutions. If central banks are unequal in their structure, and if this lack of diversity is persistent, then the norms and values coming out of those banks may not uphold gender equality in societies (OMFIF, 2021). However, regardless of these characteristics and roles, not much is known about central banks' gender patterns, as the literature has directed its focus mainly on women in academia, the private or public sectors. A deeper analysis of these aspects can be very useful in gaining a more thorough understanding of central banks in general. Moreover, central banks can be of key importance to comprehend the dynamics impacting women, not only in economics but in the broader society, and they can be seen as a benchmark and a norm setter. Additionally, little has been said about how gender patterns affect central banks' performance, i.e., their impact on inflation, output, and credit gaps, even if their long-term success can crucially depend on their people (Bank of England, 2021). If identified, gender gaps can be macro-critical and thus could be incorporated in more comprehensive analyses directed to policy advice, in line with the recent IMF Strategy Toward Mainstreaming Gender (IMF, 2022a).

We assemble a wide set of information via a newly designed survey directed to the Human Resources (HR) departments of central banks, also complemented with bilateral discussions. We collect both *quantitative* and *qualitative* data related to gender equality in a broader spectrum, including diversity policies, employment practices, earnings, leave and work arrangements, as well as childcare and other benefits. All these factors focus on women's standing in employment but also on the potential good practices in place versus gender barriers women might face that can impact their careers in central banks. We also organize these different aspects along "pillars" and respective "sub-pillars", and from this structure, we define an index— Human Resources Gender Index (HRGI) — to capture gender equality more comprehensively. Ultimately, using this set of information, we look at the macro-criticality of gender equality and how the latter is linked to a country's characteristics.

In the pilot phase, the survey was conducted in eight central banks in advanced economies (this includes G7 national central banks and the European Central Bank (ECB)),[1] and in three International Financial Institutions (IFIs) as comparators, namely: the International Monetary Fund (IMF), the World Bank Group (WBG), and the Organization for Economic Co-operation and Development (OECD). The information collected refers to the last available fiscal year for each institution (2020 or 2021).

The findings show that the surveyed central banks have room for improvement in some aspects of gender equality, also compared to IFIs. On average, central banks do well in the case of diversity targets or affirmative action policies directed toward women and other minorities (e.g., guaranteed interview schemes, scholarship, and mentoring programs). However, the measures are rarely enforced by law and are often limited to targets for people with disabilities. In other key aspects such as inclusion in professions related to economics, representation in managerial positions, having full time contracts, and facing a gender pay gap, there is a long way to go. Parental leave and flexible work arrangements are instead widely offered in central banks, but childcare and related subsidies are still limited compared to the IFIs we included in our study.

We also find that the HRGI index, hiring and promotion of women and their contract types are associated with output and credit gaps in the pilot sample. In line with some recent IMF studies, there is an economic benefit from diversity and equality (Ostry et al. 2018; Georgieva et al. 2022) and having a higher number of women can lead to superior financial stability (Sahay and Čihák, 2018). In return, broader country characteristics can be related to gender patterns in central banks, such as the percentage of women in high-level positions, government

[1] The G7 is an informal grouping of seven of the world's advanced economies: Canada, France, Germany, Italy, Japan, the UK, and the US.

effectiveness, and corruption. This also highlights the importance of role models, mentoring, and women in power to increase female participation and help them climb the hierarchical ladder.

Our findings can contribute to shedding a light on the overall state of gender equality in central banking. Additionally, this analysis aims to look at central banks as representative of the economics profession and the public sector, it can thus also provide insights into gender patterns in the broader society. This can be of utmost importance given the current economic environment. We can add to the debate by deepening the data available and identifying gaps, and good practices.

The rest of the paper is organized as follows. The next section summarizes the previous literature on gender issues in the workforce, in the economics profession, and in central banking. Section 3 describes the survey and the collected data. Section 4 and 5 present the empirical evidence and results. Section 6 concludes.

2. Literature review

Our paper relates and contributes to several strands of literature that look at female participation and overall diversity in society. Extensive literature has documented persistent gender disparities and remaining gaps, in several sectors, at different career levels, and in specific professions, including economics. This unequal situation can impact society in different ways as gender disparities can harm business performance, economic growth, and macro-financial stability. The current studies focus primarily on the general workforce, academia, or the private sectors and tend to point at issues in the aggregates or at top-level management. Qualitative data are generally scarce. Moreover, contributions covering central banking *per se* are limited and examine the topic from similar angles, mostly due to data unavailability for more granular analyses.[2]

Starting with the general workforce, women are severely underrepresented, especially in some sectors, such as construction and manufacturing (Elborgh-Woytek, et al. 2013). Even in industries where women are more present, i.e., in services such as education and healthcare, their participation is mostly confined to lower-paid occupations (Mukhtarova et al. 2021; Bertay et al. 2020). They are widely employed in more routine-prone tasks, in jobs involving less management and cognitive skills, which are more valued. This could limit improvements in closing gender pay gaps (Brussevich et al. 2018; Roberts et al. 2019). This general situation comes paired with persistent biases and discrimination, as there are disparities in access to education, health care, finance, and technology (Kochhar, et al. 2017) in addition to the gendered distribution of domestic tasks. In line with that, gender pay and promotion gaps emerge also due to the presence of children (Bertrand et al. 2010; Kleven et al. 2019). Dabla-Norris and Kochhar (2019) report that if childcare costs were to be cut by half, the number of young mothers in the labor market could increase by 10%, as women's unpaid work is largely spent on childcare (OECD, 2020a). Furthermore, when women leave the workforce, even for a limited amount of time, their careers are put on hold, which can affect their chance to be hired or promoted into senior leadership positions (Hernández Kent, 2022). Gender diversity in the labor market has been proven to be beneficial for growth and productivity. An increase in female labor force would be advantageous for the entire society, not only for women. Given a possible complementarity between female and male tasks, closing the gender gap could increase GDP by between 10 and 80%, depending on the initial value of female participation (Ostry et al. 2018) while larger tax revenues would also be unlocked, making gender equality policies self-financing (ILO, 2017).

The situation is similar in the public sector, as women are underrepresented among senior public officials (Karkee and Sodergen, 2021). More specifically in the political system, when women do attain top positions in the government, they are also more likely to occupy ministries with a social-cultural focus rather than those with economic and key strategic functions (OECD, 2012; Elborgh-Woytek et al. 2013). On the positive side, the gender

[2] For example, the Gender Balance Index by the Official Monetary and Financial Institutions Forum is the leading study on women in central banks. However, they only focus on women in upper positions of power (OMFIF, 2022).

pay gap in the public sector is generally smaller than in the private sector (Shi et al. 2019). This is possibly explained by higher salary regulation and non-wage benefits. Moreover, greater gender balance in the public realm is seen in countries with strong monitoring mechanisms (OECD, 2019) or higher income (Mukhtarova et al. 2021).[3] Furthermore, targeted policies have also proven to be helpful in the political context. The percentage of women members of parliament has grown three times faster in countries with legislative gender quotas for parliamentary elections (EIGE, 2021).[4] Hence, some country characteristics, benefits, and active target policies are linked to gender equality in the public sector. In return, greater female representation in political arenas has also been associated with positive policy outcomes.[5]

The private sector generally performs less well, with an even smaller female participation, and especially among board members and managers. For instance, less than a quarter of the EU's largest companies has gender-balanced boards (EIGE, 2021). Several studies have looked at how the percentage of female managers is linked to firms' characteristics, identifying that the gender wage gap is notably smaller when there is a higher share. Women's presence in managerial roles could shift the distribution of compensation, favoring female employees, and successfully reduce the gender wage gap (Theodoropoulos et al. 2022). Moreover, gender-balanced boards improve a firm's performance, particularly in high-tech manufacturing and knowledge-intensive activities, due to a different attitude toward risks and different skills and competencies brought by men and women respectively (Dabla-Norris and Kochhar, 2019; Georgieva et al. 2022). Diversity in firms attracts the best talents, improves customer orientation, employee contentment, engagement, and better decision-making. All these factors make a business impact, leading to greater profitability (OECD, 2020b).

Moving to academia, the literature has shown, once again, persistent disparities when climbing the hierarchical ladder. The so-called "leaky pipeline" (Buckles, 2019; Auriol et al. 2020; Garcia-Penolosa and Zignago, 2022) which defines the gap between female representation in junior versus senior ranks, is very much present. This evidence could stem from women suffering from poor confidence or encouragement by placement officers and advisors, consequently leading them to refrain from applying to top positions, and from persistent stereotypes and biases.[6] Letters of recommendation utilize different adjectives depending on the gender of the applicant, and those used for women are perceived more negatively in hiring choices (Auriol et al. 2022). Women are held to higher standards compared to their male counterparts in teaching, as seen in evaluations (Buser et al. 2019) and co-authorships (Hengel, 2017, Lundberg and Sterns, 2019). Additionally, all-female-authored papers are much less likely to be accepted to conferences than all-male-authored ones (Hospido and Sanz, 2019), which has important consequences, since achieving tenure is largely influenced by publications. Moreover, gender disparities in academia affect female students too, as they are likelier to get matched with female advisors, who are often more junior and less established within academia (Baltrunaite et al. 2022).

This goes in hand with the lack of female representation in the economic fields (Lundberg and Stearns, 2019; Meade et al. 2021) and thus economics professions (Yellen, 2019; Ginther et al. 2020) where women holding a PhD are scarcer and suffer from more biases and obstacles, hindering their careers (Baltrunaite et al. 2022). When women do present in seminars in economics departments, they face biases, by consistently receiving more questions, and they are harsher and more patronizing ones (Dupas et al. 2021). Across economic fields, women are mostly found studying labor discrimination, education, and poverty, and are less than 20% in

[3] In general, assessing and quantifying public sector performance is challenging and done through micro-measures such as satisfaction surveys, or task completions rates and individual performance indicators. Other ways to assess it are cost-weighted outputs, service delivery indicators, budget execution rates (Ravi, 2021).

[4] Globally, after the implementation of quotas and the consequent increase of women in politics, governments also tend to spend a larger amount of their national budget on public health (Clayton and Zetterberg, 2018).

[5] For example, in Indian municipalities, female representation in leadership and legislative positions leads to an increase of investments in public goods, and especially, in health and education (Hessami and Lopes da Fonseca, 2020).

[6] De Paola and Scoppa (2015) find that equally productive female economists in Italy are less likely to be promoted to associate or full professorship when randomly assigned to an all-male promotion committee, but there is no gender gap when women are assigned to a mixed-gender committee.

econometrics, finance, or macroeconomics (Beneito et al. 2021), which are the fields from which central banks hire (Verdun, 2022).

It is no surprise, considering these premises especially for public sector and economics professions, that central banks carry similar issues. These institutions are mostly male dominated, especially among managers. A wage gap between men and women has been detected within a few years of hiring, despite broadly similar conditions, and women in central banks tend to apply for fewer promotions (Hospido et al. 2020). Gendered preconceptions are also affecting women in central banking, as men are generally believed to be more competent, particularly in management (Bodea and Kerner, 2022; Carli and Eagly, 2016). The impact of women in top positions on the overall representation also should not be overlooked. Masciandaro et al. (2020) find that when a central bank has at least one woman on the board of its monetary policy committee, the number of women included in future committees has a higher chance of increasing and can help when it comes to gender representation within the bank. Once again, there are benefits of greater diversity for central banks. A more diverse pool of economists can be beneficial for banks' performance, by driving better decision making and including new topics to the field (Madouros, 2019), such as climate change (Megalokonomou, 2021). A higher share of women in monetary policy committees and boards can lead to greater monetary and financial stability, which are the core of central banks' objectives (Diouf and Pepin, 2017; Masciandaro et al. 2016; Sahay et al. 2018). Diouf and Pépin (2017) find that female chairs in central banks focus more on achieving price stability goals. This outcome can be linked to the fact that women are more resistant to political pressures than men, but they may also seek to prove that they can be tougher than men. This, in terms of central banks chairs or board members, translates in a hawkish rather than dovish attitude, i.e., they are more aggressive in fighting inflation as they need to gain a solid reputation and credibility in male-dominated environments (Masciandaro et al. 2016; Masciandaro et al. 2020).[7]

Despite this evidence, gender has not appeared as a priority in the design and execution of policies affecting monetary positions, but also in banking regulation, deposit insurance, or bond issuance (Bhatia, 2021). Women are a minority, from being depositors and borrowers, to being managers and regulators (Loko and Yang, 2022). Fouejieu et al. (2020) show that a bigger financial inclusion gap between men and women results in higher income inequality. The financial inclusion of women is thus important because it can affect economic development, inequality, and poverty. Sahay et al. (2015) and Sahay and Čihák (2018) demonstrate that better access to banking services for households and firms leads to greater growth as well, contributing to the macro-criticality of gender mainstreaming.

Our study complements these existing strands of literature on gender issues, through conducting a granular and multidimensional study of gender patterns, policies, drivers, and outcomes in central banking. It can, therefore, be instrumental in several ways. Firstly, our project extends and deepens the quantitative and *qualitative* data available on the topic. It can shed a light on women's standing in employment at *different* levels of seniority and jobs and can show the potential gender barriers they face that can impact their positions in central banks. We can pin down where the remaining issues lie, measure the gaps, establish benchmarks, and highlight good policies. Moreover, this work shows that various aspects related to gender equality are indeed macro-critical via their links to central banks' performance,[8] while also demonstrating how some countries' characteristics can be linked to gender patterns.

[7] These results may be driven by a general trend towards more conservative central banks in the analyzed timeframe and countries considered in the studies (in 9 main OECD countries in 1999- 2008) where a hawkish reputation would generally be preferred. Therefore, in Masciandaro et al. (2016) gender preferences are considered endogenous with respect to the overall structural and institutional settings.

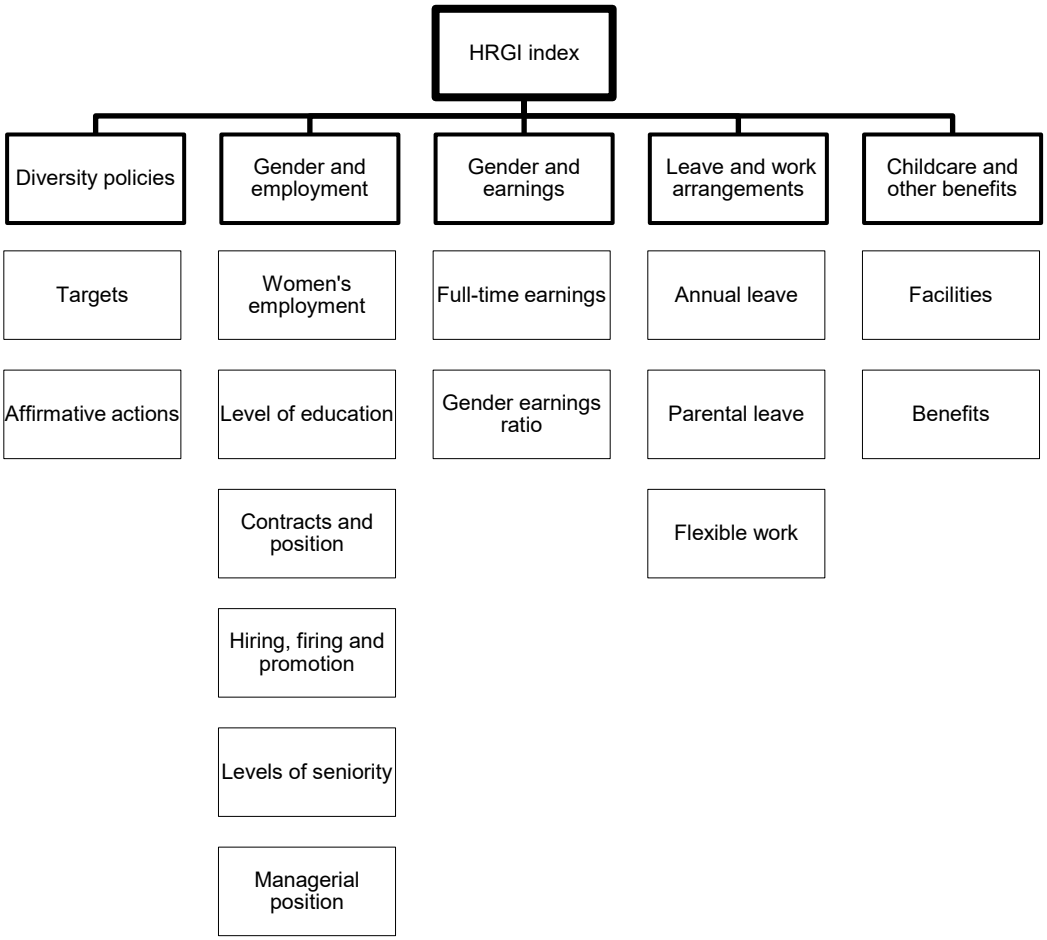
[8] Central bank's performance here is intended with respect to central banks' objectives, as practical interpretation of the mandated goals in terms of what monetary policy aims to achieve (see Unsal et al. 2022). Objectives may involve not only price stability but also financial stability and managing economic fluctuations. In central banks, especially outside the G7, exchange rate stability can be also one of the objectives (see IMF, 2022b).

These institutions can be a key angle to look at and to understand the dynamics of women in economics, and we identify some paths for progress from a more extensive analysis of their gender data and practices. This work, by taking the central banks also as a blueprint for the public sector, can play a role in the creation and standardization of good practices, more broadly.

3. Description of the survey

We designed a multidimensional survey of 20 questions on gender patterns and practices (available in Appendix) directed at HR departments in central banks, complemented by bilateral discussions with the institutions.[9] In the pilot phase, the survey has been conducted in eight central banks (this includes G7 national central banks and the ECB), and in three IFIs as comparators: the IMF, the WBG and the OECD.[10] The information collected refers to the last available fiscal year for each institution (2020 or 2021).

Figure 1: The Human Resources Gender Index (HRGI) index, pillars, and sub-pillars



[9] The survey only covers information on gender, and for the time being, nonbinary employees are not included in the scope of the survey.

[10] When relevant, IFIs specified if the information apply to HQ only. For the WBG, the survey's replies concern the entire group.

The survey considers different aspects related to gender: diversity policies, employments practices (how many women are on part-time contracts, the roles they have, among others),[11] earnings, leave and work arrangements, as well as childcare and other benefits. All those factors focus on women's standing in employment, and on the potential gender barriers and biases they might face that can impact their positions and careers in central banks. Some questions aim to disentangle when the policies are required by law, or when central banks implement them as a choice/on a voluntary basis and give information on how long these policies have been in place. Most of the questions have an open section for more details or clarifications, if needed. We further organize the above-mentioned aspects along "sub-pillars", for a total of 15, that condense the greater level of granularity gathered from the survey (see Figure 1 and in Appendix). Some of the sub-pillars include more than 1 question each (for instance on contracts and position, or gender earnings ratio) and within each question multiple options are available. Then the sub-pillars are summarized in 5 "pillars", as shown in Figure 1.

From this structure we define an index—Human Resources Gender Index (HRGI) —to capture gender equality in a more comprehensive way and quantify it numerically. This is particularly useful for empirical analyses (see section 5) and for an overall view of both quantitative *and* qualitative aspects we collect related to gender patterns. The information from each question (and option) of the survey is translated as a score that spans from 0 to 1, with 1 being the maximum in terms of equality.[12] These scores are averaged first by sub-pillars, then we take the averages across sub-pillars to build their respective pillar's scores. The overall HRGI index is then compiled either as an average across pillars (see Figure 2: Average HRGI index by pillars) or as a simple average across all the questions.[13] We do so for each of the 7 national central banks and ECB, as well as for the IFIs. We report the main average outcomes in section 4.

4. Evidence for central banks

In this section, we first present evidence from our comprehensive HRGI index, moving then to look specifically at the qualitative and numerical information gathered in the survey, along the 5 pillars. We also draw comparisons between the average of participating central banks and IFIs, which are our benchmark institutions. IFIs can be considered comparable to central banks as they also hire large numbers of economists. Moreover, they have a wider reach as they represent and/or act for multiple countries.

For the 8 central banks in the pilot, the HRGI index is on average slightly below 0.7 on a maximum level of 1 (Figure 2).[14] This varies between 0.32 and 0.91, indicating heterogeneity across central banks when it comes to specific areas such as diversity policies, career, level of seniority, work arrangements, or available childcare policies. The smallest dispersion of scores at pillar level can be seen in leave and work arrangement, where central banks are all around or above 0.7.

Overall, the group of IFIs performs better in terms of gender equality, with a HRGI index greater than 0.7. IFIs' good performance can be attributed to their significant focus on gender, and best practices come with awareness of issues and gaps at hand.[15] This is especially relevant in the score for the pillars on gender and employment,

[11] We cover (macro) economists and finance experts as well as administrative staff, HR experts, IT professionals and lawyers and at different stage of their career, including new hires and departures.

[12] The scores can take the form of 0, 0.5, 0.8, or 1 as the maximum. No answers are taken as n/a. The detailed methodology for translating survey results into scores is available in Appendix. More details are available upon request.

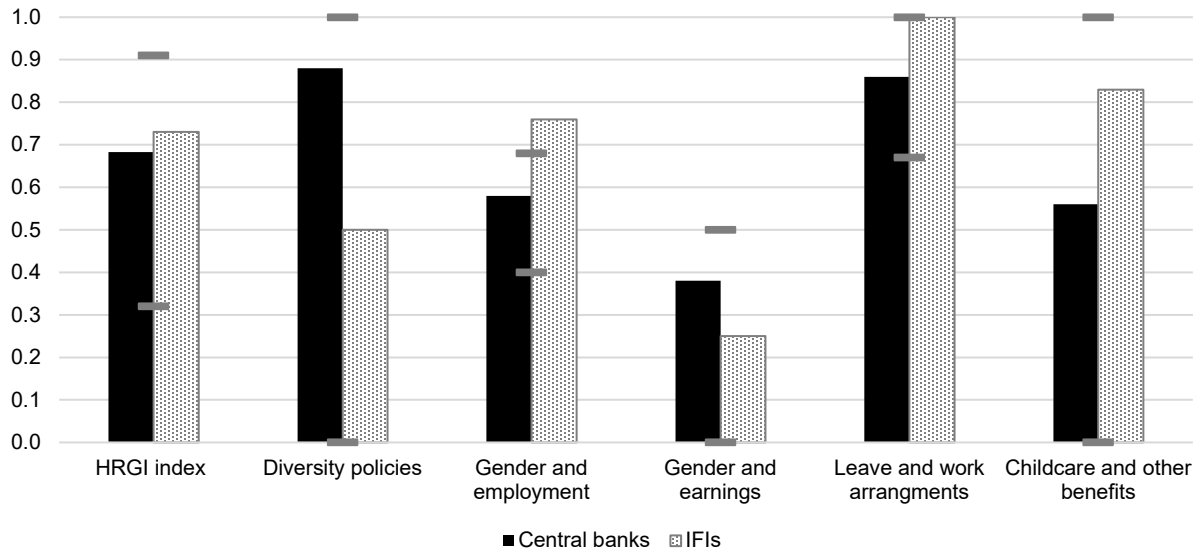
[13] We take here an agnostic view, not imposing different weights to any question, sub-pillar, and/or pillar. Hence, we do not claim that anyone is more important than another in representing or contributing to gender equality.

[14] The average HRGI index calculated as a simple average across all questions (between 0.50 and 0.83), rather than by pillars, still shows variation across the sampled banks, albeit smaller.

[15] OECD: OECD (2021), OECD (2020a), and Sikora and Pokropek (2011) and Gender Initiative. IMF: Gender and Economics, and A Proposed Strategy for Gender Mainstreaming at the IMF. WBG: World Bank Group Gender Strategy (FY16-23).

and childcare and other benefits. As for diversity policies and earnings, however, central banks outperform IFIs on average.

Figure 2. Evidence from the HRGI index and pillars



Note: The chart represents the HRGI index and its pillars, scoring from 0 to 1 (max score for equality). The bars are averages across groups: either central banks or IFIs. The lines refer to the range of central banks individual scores (minimum and maximum).

The contribution of this work is even clearer when looking at what is behind the index and at the granular information central banks (and IFIs as comparator) provided in the survey, i.e., in terms of numerical data, qualitative details and additional comments. We do so by proceeding along the 5 pillars, deepening our analysis at sub-pillar and questions/options level.

Diversity policies. Starting from the first pillar, we observe that 62% of central banks have gender targets in place, as opposed to a slightly higher share of IFIs (67%). Affirmative action policies directed to gender diversity are applied in 2/3 of central banks, and similarly, in 67% of IFIs. Examples of these actions include guaranteed interview schemes, scholarships, or mentoring programs for women. For both targets and affirmative action policies directed at gender equality, only 12% are enforced by law in central banks, while none are in IFIs. As for diversity in a broader spectrum, almost 90% of the central banks in our sample use diversity targets and affirmative action policies as good practices to try to hire, retain and promote minorities, not only women. These measures are directed at different personal characteristics: sexual orientation, race, ethnicity, national origin, religion/faith, age, disability or special needs status, and military service. For example, they involve offering a wide range of scholarships aimed at these individuals or by providing wellness centers with multi-purpose spaces that allow for meditation or prayer. However, in the case of broadly defined diversity actions, slightly more than a half of central banks (compared to 30% of IFIs) implement these targets and actions due to compulsory national legislation.

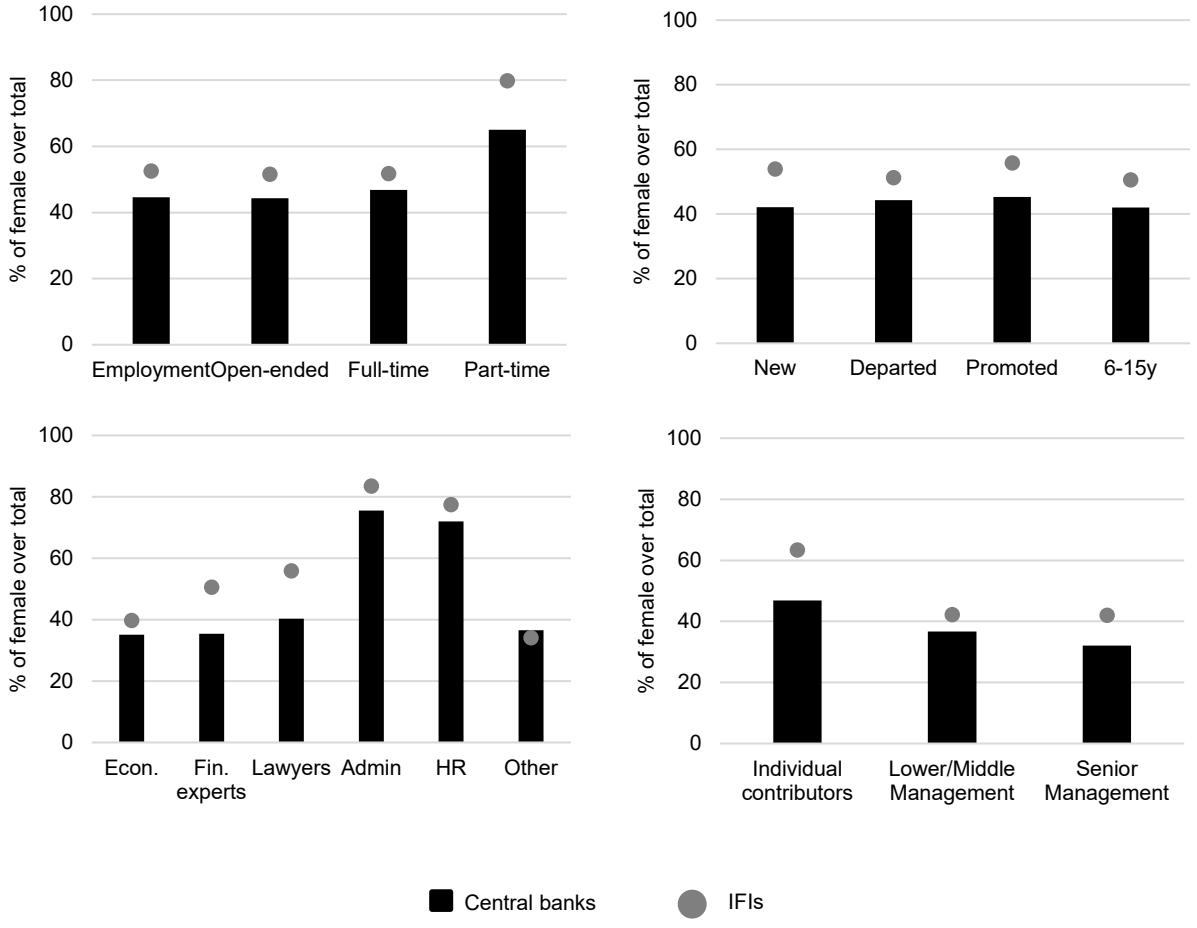
Gender and employment. In the covered central banks, the percentage of women employed on average is still below half of the total (44.6%), while IFIs are above the 50% threshold (see Figure 3). These numbers, however, can hide a different landscape if we look deeper at contract types, promotions, and career progression.

There is a wide gap in central banks between the percentage of women over the total of full-time and part-time contracts (the latter being 65% on average, with the highest percentage recorded being 79.3%). Even if part-time contracts do offer flexibility and can be seen as a concrete help for women, especially in case of young children, they can also create a ‘part-time trap’ if this option is only widely used by women. Part-time contracts mean

spending less time at work and this can affect their chances of being hired or promoted into senior leadership positions. The 'part-time trap' can be seen in the selected central banks, as a very high share of part-time contracts are held by women while, at the same time, women are less present in the hierarchical ladder of power and jobs. In comparison IFIs, even though they have a higher share of women on part-time contracts (79.8%), perform slightly better in management positions and promotions of women. Therefore, the percentage of part-time contracts translates less into a 'part-time trap'.

The highest female shares in central banks, close to 80%, are recorded in administrative and HR roles. Contrastingly, on average only 35% of economists are women, ranging from 26.0% to 43.3%, and the situation looks similar in the case of financial experts. Gendered occupational segregation can reinforce the gendered beliefs concerning women's capacities in the workplace, creating further barriers to their success in male-dominated roles and perpetuating earning inequalities (Elborgh-Woytek et al. 2013; Das and Kotikula, 2019). In comparison, IFIs have a gender balanced pool of financial experts, and more female economists, lawyers, or attorneys than the average of the central banks considered. More women holding PhDs (36.4%) work for these organizations than in the participating central banks (29%). They also have a higher share of women being promoted in the last year.

Figure 3: Gender and employment pillar and main sub-pillars



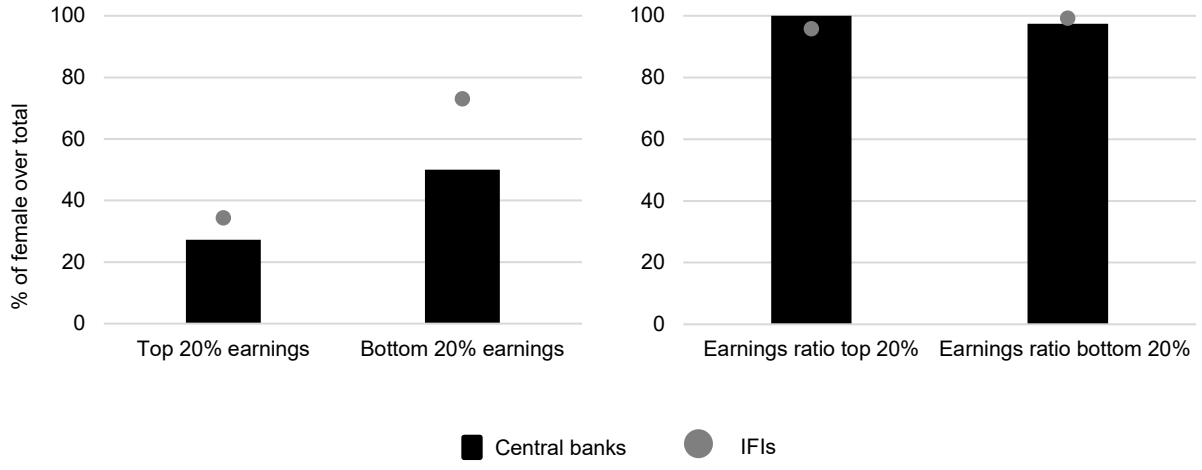
Management positions are also largely male dominated. The female share of lower/middle management positions in the covered central banks is 36.7%, while women occupy 32% of senior management positions. The

highest percentage of female managers is slightly below 45%, with the lowest being only around 15%, highlighting once more the heterogeneity even in this sample of advanced economies. In comparison, IFIs have a greater presence of women in management, with about 42% in both lower/middle and senior positions.

In the surveyed central banks, the percentage of newly hired female staff is under 50% on average, even if in some cases, efforts have been made to increase their recruitment. For example, mentoring programs and networking events have become increasingly popular in central banks attempting to better their diversity and inclusion practices. Other actions included targets in hiring and promotions, as well as scholarships (as reported by Hospido et al. 2020; Schnabel, 2020 for the ECB). The central banks and IFIs appear to be on the right track in retaining female employees over the years, with the former having 47.2% of women working in the banks for more than 15 years, and the latter 53.6%. However, this alone does not necessarily lead to better female representation in senior positions within the same institution. As we have seen, senior roles are primarily male-dominated, and the 'leaky pipeline' phenomenon is very much present.

Gender and earnings. The promotion gap goes hand in hand with the gender pay gap and can be observed in the percentage of women in the bottom versus the top 20% of the annual base salaries for full-time employees. Both the analyzed central banks and IFIs underperform when it comes to a balanced distribution of earnings based on annual base salaries. The central banks have an equal percentage of women earning the bottom 20% (50%), as opposed to a much higher share of women in IFIs (73%). However, the major issue in central banks arises when looking at the top 20%. The central banks perform less well, with an average of 27.3% women in the top 20%, compared to 35% for IFIs. This does not translate into a gender pay gap at the very top, however, as the difference in earnings between genders is small when women reach the top percentile, i.e., women earn approximately the same salary as their male counterparts (Figure 4).

Figure 4: Gender and earnings pillar and sub-pillars



Note: The earnings ratio is the ratio of the average annual base *salary* of women in the bottom (top) 20% of annual base salaries, over the average annual base *salary* of all men in the bottom (top) 20% of annual base salaries. For these charts, only full-time employees are included.

Leave and work arrangements. Concerning leave and work arrangements across participating central banks and IFIs, flexible work hours, telecommuting, compressed work schedules, and part-time are widely available. Half of the central banks offer between 10-25 days of annual leave, while the other half accord more than 25 days. All central banks offer (paid) parental leave of more than three months. They give three months for fathers and allow mothers to take additional time if needed. Primary caregivers always get the longest parental leave time. Although in the case of IFIs, some have combined maternity and paternity leaves into parental leave, with two of the IFIs allowing parents to take more than 3 months off.

Childcare and other benefits. However, in central banks, childcare facilities and related subsidies are limited. This can impact mothers negatively as they bear most of the responsibility for domestic care tasks associated with children and the elderly (OECD, 2021; Alonso et al. 2019). Around 60% of central banks do *not* offer nurseries at their headquarters or spaces in local nurseries reserved for staff, as opposed to 30% of IFIs. 75% of the central banks, compared to 67% of IFIs, do *not* offer vouchers or any form of subsidies. On the other hand, other benefits such as advisory services and family support services are available in all central banks. Examples of those are monthly pre-school allowances paid for children up to school age, and HR procured family care service which provides cost-free information about childcare options. In some cases, employees are also offered paid days which can be used for family-related reasons and allows for leave of absence to provide care to a critically ill or injured child.

5. Empirical results

In this last section, we use both granular numerical information from the survey and the HRGI index and pillars to investigate a) on the one hand if gender equality, and which of its aspects, are linked to central bank's performance (looking at inflation, output, and credit gap) and b) on the other hand how broader country and bank's characteristics can influence gender equality. We answer these questions via statistical techniques, based on model averaging algorithms.

Our empirical analysis covers 8 central banks with data ranging from 2010 to 2021. We use external sources from: IMF WEO, WB Worldwide Governance Indicators (WGI), OECD, Bank for International Settlements (BIS), Eurostat, United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Economic Commission for Europe (UNECE), European Institute for Gender Equality (EIGE), Dincer et al. (2022), and Garriga (2016). We include the numerical data from the survey, together with the HRGI index and the pillars which also embed qualitative information.

The statistical techniques we use are based on model averaging algorithms and help to understand the relevance of each regressor in potentially affecting our variable of interest, in a context of limited data availability. Significantly, we do not claim any causality in this approach. These methods combine information taken from parameters of each possible linear model using a weighted average of conditional estimates, i.e., they incorporate model uncertainty as well as uncertainty about estimations, selecting the best model available in the set. We use as the preferred method the Weighted-Average Least Squares (WALS) proposed by Magnus et al. (2010) and Magnus and De Luca (2016).[16][17] The WALS approach reduces the computational burden compared with other methods, and combines frequentist, i.e. (constrained) least squares, estimations with only the weights taken as Bayesian. A key advantage of WALS is that the priors here are neutral, so the method relies on a transparent definition of prior ignorance. As in Magnus et al. (2010), we consider a guideline for "robustness" of a regressor as to have an absolute t-ratio of 1, which corresponds to a posterior inclusion probability of 0.5 (Masanjala and Papageorgiou, 2008).[18] The outcomes in Table 1 and 2 then refer to possible factors affecting our dependent variables based on this technique and guideline.

[16] The alternative to WALS is the Bayesian Model Averaging (BMA) method (used in Sala-i-Martin et al. 2004 and Masanjala and Papageorgiou, 2008, among others). We keep this only as a robustness check as this method relies fully on Bayesian weights and estimates, hence informative priors need to be known and specified. With BMA, the main results are broadly confirmed, but credit gap appear to be driven more by contract types and the overall HRGI index, than new hires or promotions. The HRGI index is less related to central bank's transparency and country's characteristics. For the latter, level of corruption, however, is confirmed to be one of the main drivers of the HRGI index.

[17] The variables selected for the analysis depend on data availability. If they are not present in the tables, it is either because of data availability or because their absolute t-ratio is zero.

[18] T-ratio is defined as the ratio between the estimated coefficient and its estimated variance.

We analyze first the link between gender equality, represented by the HRGI index and its components, and central bank's performance (Table 1). We look at 3 possible measures of the latter: the difference between realized inflation and target inflation, output gap, and credit gap.[19] These are to cover both monetary policy and financial stability, as they form the core of central banking's role and objectives. We also control for other characteristics such as central bank transparency (Dincer et al. 2022) and independence (Cukierman et al. 1992; Garriga, 2016). From our analysis, we do not see any clear relationship between gender equality and inflation. This is possibly due to the limited changes in the inflation rates during the low inflation environment up to 2020 in our sample of countries and is thus not reported in the table below. The main robust result across methods and setups is that our comprehensive measure of equality, the HRGI index, and among its pillars, leave and work arrangements, correlate to central bank performance.[20] Some aspects such as the percentage of new female hires, female promotions, part-time and open-ended contracts are also significantly linked to output and credit gaps. [21] There are no studies, to the best of our knowledge, that link these specific aspects of gender directly to financial stability. However, our findings are in line with Sahay et al. (2018) showing that having a higher number of women in supervisory boards can lead to superior financial stability. There are different reasons to explain this outcome, including women being better at managing risks, being more qualified and experienced, and bringing diversity of thought, which ultimately, leads to better decisions. However, there could be a reverse causality, as institutions that tend to attract and select female executives may be better-managed.

Table 1: Gender equality and central banks performance

	output gap	credit gap
HRGI index	✓	✓
Diversity policies		
Gender and employment	✓	
Gender and earnings		✓
Leave and work arrangements	✓	✓
Childcare and other benefits		
New hires, female%	✓	✓
Promotions, female%		✓
Part-time contracts, female%		✓
Open-ended contracts, female%	✓	✓
Central bank transparency index		✓

Note: We use the Weighted-Average Least Squares (WALS) proposed by Magnus et al. (2010) and Magnus and De Luca (2016). As in Magnus et al. (2010), we consider a guideline for "robustness" of a regressor to be whether it has an absolute t-ratio of 1, which corresponds to a posterior inclusion probability of 0.5 (Masanjala and Papageorgiou, 2008). We control for central bank transparency index (Dincer et al. 2022) and independence (Cukierman et al. 1992, Garriga, 2016). Data for the gaps are from IMF WEO and BIS.

[19] Output gap data are taken from IMF WEO and credit gap series are from the BIS. The latter is calculated as the difference between the credit-to-GDP ratio, based on total credit to the private non-financial sector over GDP, and its long-term trend, in percentage points. In both cases, the measures are derived from one-sided HP-filtering. It has been proven in Celov and Comunale (2022) that simple HP-filtering can be acceptable for the extraction of trends and cycles, for instance in the euro area.

[20] We take the HRGI as overall average. The results are robust taking instead the mean of pillars' averages (see Figure 2).

[21] We find that the HRGI index, its pillar on gender and employment, and the percentage of open-ended contracts held by women are significant and positively correlated with the output gaps, for instance. This means that an increase in the HRGI index could help reduce the output gaps, as in the covered sample these have been mainly negative. The coefficients in the WALS method are estimated by (constrained) least squares, and given the relatively small sample, should be taken with a grain of salt. The full set of outcomes is available upon request.

Regarding output gaps specifically, there are several studies pointing at the fact that more women in the labor market can be associated with greater productivity and growth.[22] One key mechanism in place is that men and women can complement each other in the workplace by bringing different skills, competencies, and perspectives to the table, especially concerning risk and collaboration, as well as by responding better to incentives (Sahay et al. 2018). Moreover, gender gaps in labor force participation hurt a nation's human capital by reducing the pool of talent available, which can hamper its capacity to create and carry out ideas. Consequently, this inability for female human capital to accumulate properly, stalls technology use and innovation (Kazandijan et al. 2016). There is thus an economic benefit from diversity that is stronger than just the benefits resulting from having more workers (Ostry et al. 2018; Dabla-Norris and Kochhar, 2019). In general, better policymaking is also linked to greater equality, by providing a better service to the public thanks to the diverse perspectives, lived experiences, and creative thinking, that can inspire better ideas, and decisions that diversity brings (Yellen, 2019; Carney, 2019).

We now look at how broader country and bank's characteristics can influence gender equality, in return. A robust role is played by the percentage of women in high-level positions, either in central banks themselves (EIGE data) or in other sectors (Table 2).

These two factors have a strong link with the overall equality in central banks, measured by the HRGI index, as well as to the share of female new hires or promoted employees. Once more, this finding stresses the importance of role models, mentoring, and women in power to increase female participation and help them climb the career ladder (Schnabel, 2020; Chhaochharia, et al. 2022). As shown in Masciandaro et al. (2020), when central banks have no women on their policy board, they see very little change over the years when it comes to gender representation within the bank. Women at the top of an organization are given more power to support and promote women in formal and informal ways, and could shift the distribution of compensation, favoring female employees (Theodoropoulos et al. 2022). Lastly, a country's characteristics, such as the control of corruption and the effectiveness of government, are other possible factors linked to greater equality in central banks and are significantly related to the share of newly hired and promoted women. Corruption itself can be gendered and can impact a country's societal norms. Indeed, if a government body establishing the laws of a nation is corrupt, then the norms and values from these institutions will trickle down to all levels of society and negatively impact its citizens (Debski et al. 2018; Norris, 2019).

Table 2: Country and bank's characteristics linked to gender equality in central banks

	HRGI index	New hires, female%	Promotions, female%
Central bank factors			
Central bank decision making body, female%	✓	✓	✓
Central bank transparency index	✓	✓	
Public/private representation			
Ministries, female%	✓	✓	✓
Parliament, female%			
Government, female%	✓	✓	✓
Academic graduates, female%			
Academic head of universities, female%	✓	✓	✓
Board members largest listed companies, female%	✓	✓	✓

[22] As a comparison (upon request), we look at the overall female employment in the labor market and this is solely linked to the output gap.

Worldwide Governance Indicators (WGI)			
Voice and Accountability	✓		✓
Political Stability and Absence of Violence/Terrorism			
Government Effectiveness	✓	✓	✓
Regulatory quality			
Rule of Law			
Control of Corruption	✓	✓	✓
Total female participation in country			
Female% country	✓		✓

Note: We use the Weighted-Average Least Squares (WALS) proposed by Magnus et al. (2010) and Magnus and De Luca (2016). As in Magnus et al. (2010), we consider a guideline for "robustness" of a regressor to be whether it has an absolute t-ratio of 1, which corresponds to a posterior inclusion probability of 0.5 (Masanjala and Papageorgiou, 2008). We control for central bank transparency index (Dincer et al. 2022) and independence (Cukierman et al. 1992, Garriga, 2016). The external data are from OECD, World Bank, ILO, UNECE, EIGE, and UNESCO.

6. Conclusions

Central banks are at the core of the economics profession, paragon of public institutions, and should represent the population of nation(s) they serve. Moreover, for decades they have formed a vital part of the training of economists worldwide. Analyzing these institutions can help shed light on broader gender patterns and can be seen as a benchmark for the broader public sector. Yet, the current literature mostly restricts the analyses to their overall female employment, or the share of women in boards and monetary policy committees. We know virtually nothing about how central banks hire, fire, promote, and retain their professional staff, or the good practices in place and gender barriers women face. Hence, we designed a multidimensional survey directed at HR departments in central banks to increase awareness of these issues and to understand gender equality in central banks (and, hence, central banks themselves) more comprehensively. We include aspects such as diversity policies, employment practices, earnings, leave and work arrangements, as well as childcare and other benefits. Ultimately, we create a 'scoring' system and build an index of equality—Human Resources Gender Index (HRGI)—that is comprehensive and holistic. This index allows us to summarize both *quantitative* and *qualitative* information and is used for empirical analyses.

We show that the central banks we surveyed (eight central banks including G7 national central banks and the ECB) have room for improvement in some aspects of gender equality. These central banks perform well on average in the case of diversity targets or affirmative action policies, but the measures are rarely enforced by law. Central banks are still lagging in other key aspects such as inclusion in professions related to economics, representation in managerial positions, having full-time contracts, and facing a gender pay gap. Parental leave and flexible work arrangements are widely offered, but childcare and related subsidies are limited.

In the pilot sample, we also find that the HRGI index, hiring and promotion of women and their contract types are associated with output and credit gaps, in line with recent IMF studies. On the other hand, the percentage of women in high-level positions in different sectors of society can be linked to gender equality, highlighting the importance of role models, mentoring, and women in power to increase female participation and help them climb the hierarchical ladder. Other country characteristics such as government effectiveness and corruption are also linked to equality.

Beyond the pilot phase, we plan to extend the coverage worldwide, to provide a complete, exhaustive view of gender equality in central banking. Along these lines, this study can be related to the recent IMF Strategy Toward Mainstreaming Gender in several ways, as the strategy sets out how the Fund, within its core functions, can help

member countries address gender issues via their policies. Firstly, our project extends and deepens the *quantitative* and *qualitative* data available on the topic. We can pin down where the remaining issues lie in central banking, measuring the gaps and establishing benchmarks, which can be of guidance for future analyses and best practices to consider adopting. Moreover, this work shows that various aspects related to gender equality are indeed macro-critical via their links to central banks performance. This can be especially timely given the current economic environment.

As we expand the sample of central banks and more data points are included, we would be able to perform more extensive econometric analyses, not only on central banks performance but also on other aspects, i.e., impact on financial development, innovation, climate change policies, etc. as diversity can be instrumental in several ways to face the challenges that the 21st century have been imposing. Finally, the scope of our survey can be potentially extended beyond gender, specifically to analyze a broader definition of diversity.

Appendix

Survey directed to central banks (HRGI index pillars and sub-pillars)[23]

Questions	*Options*	*Scores*
Diversity policies		
Targets		
Does the central bank have diversity targets[i] based on *(check all that apply):* (By choice or by law) [Include time horizon]	Gender; Sexual orientation; Race; Ethnicity; National origin; Religion/faith; Age; Disability or special needs status; Military Service; Other individual characteristics (please specify).	yes = 1/ No= 0
Affirmative actions		
Does the central bank implement any other affirmative action policies[ii] based on *(check all that apply and please specify):* (By choice or by law)	Gender; Sexual orientation; Race; Ethnicity; National origin; Religion/faith; Age; Disability or special needs status; Military Service; Other individual characteristics.	yes = 1/ No= 0
Gender and employment		
Women's employment		
What percentage of all employees[iii] are female?		if >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
Level of education		
What percentage of all employees have as their highest level of education: [%Total of which %Female, %Male]	Primary education; secondary education; higher education[iv];	if female <50% is 1. If between 50% and 70% is a 0.8, >70% is a 0
	bachelor's degree; Master's degree; PhD.	if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
Contracts and position		
What percentage of all employees are on open-ended[v] contracts? [%Total, of which %Female, %Male]		if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
What percentage of all employees are on fixed term[vi] contracts? [%Total, of which %Female, %Male]		if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
What percentage of all employees are employed full-time[vii]? [%Total, of which %Female, %Male]		1 if female between 45% and 55%
What percentage of all employees are employed part-time[viii]? [%Total, of which %Female, %Male]		1 if female between 45% and 55%
What percentage of all employees work as: [%Total, of which %Female, %Male]	Economists; financial sectors experts; attorneys or lawyers; research assistants, trainees/interns, financial analysts; other professionals (e.g., IT professionals, editors,	if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0

[23] A section for 'Reason for no answer' is included in each question.

	engineers, graphic consultants); other operational or support staff (e.g., security personnel, mail clerks, cleaning staff).	
	Administrative staff (e.g., staff assistants, administrative assistants); HR staff.	if female >55% is 0
Hiring, firing and promotion		
In 2020, what percentage of newly hired[ix] employees were female or male?		if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
In 2020, what percentage of permanently departed[x] employees were female or male?		if female <50% is 1. If between 50% and 70% is a 0.8, >70% is a 0
In 2020, what percentage of promoted employees were female or male?		if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
Levels of seniority		
What percentage of all employees have been working for the central bank for: [%Total, of which %Female, %Male]	1-5 years, 6 to 15 years, more than 15 years.	if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
Managerial position		
What percentage of all employees are: [%Total, of which %Female, %Male]	Individual contributors[xi], lower/middle management[xii], senior management[xiii]	if female >50% is 1, if between 40% and 50% is a 0.8, between 30% and 40% is 0.5, if less is a 0
Gender and earnings		
Full-time earnings		
What percentage of all full-time employees earn: [%Total, of which %Female, %Male]	The top 20% of annual base salaries[xiv]; the bottom 20% of annual base salaries[xv]?	1 if female between 45% and 55%
Gender earnings ratio		
What is the average gender earnings ratio for full-time employees?	For the average of the top of 20% of annual base salaries[xvi]; for the average of the bottom 20% of annual base salaries[xvii].	if >98 is 1 otherwise 0 -- closer to 100 is the best
Leave and work arrangements		
Annual leave		
How much annual leave[xviii] do full-time employees get on average[xix]?	More than 25 days, 10-25 days, less than 10 days.	more than 25 days/year = 1
Parental leave		

What are the conditions for maternity or paternity leave *(check all that apply)*? [Please specify if different conditions apply for different categories of employees and please specify if different family or income conditions apply]	No maternity leave granted; up to 3 months unpaid maternity leave; more than 3 months unpaid maternity leave (duration in months); up to 3 months paid maternity leave; more than 3 months paid maternity (duration in months); additional optional unpaid maternity leave (maximum in months, if exists); no paternity leave granted; up to 3 months unpaid paternity leave; more than 3 months unpaid paternity leave (duration in months); more than 3 months paid paternity leave (duration in months); additional optional unpaid paternity leave (maximum in months, if exists).	if both = 1 and only maternity 0.5 none 0
		Paid =1, not paid =0
Flexible work		
Does the central bank offer flexible work arrangements *(check all that apply)*?	Flexible work hours[xx], telecommuting[xxi], compressed work schedule[xxii], other (please specify), none.	yes = 1/ No= 0
Childcare and other benefits		
Facilities		
Benefits		
Does the central bank offer childcare facilities and/or other benefits *(check all that apply)?*	Childcare facilities, vouchers, or subsidies available for childcare support (please specify), other (please specify), none.	yes = 1/ No= 0

DEFINITIONS and NOTES

[i] **Diversity targets:** Numerical goals that aim to ensure equitable representation of disadvantaged or underrepresented groups (e.g., females or minority groups) in the central bank. These targets may be voluntarily adopted or obligatory by law. These targets may further be set on various employment-related aspects (e.g., hiring, representation among employees, or promotions) and may comprise stock concepts (e.g., a target to have gender balance – 50% of employees composed of females and 50% of males) or on flow concepts (e.g., a target to have 50% of new hires comprising of females).

(Note: We define diversity targets as distinct from quotas in that quotas have mandated outcomes, while targets are aspirational goals).

[ii] **Affirmative action:** Any voluntary or obligatory policies designed to redress past discrimination against disadvantaged or underrepresented groups in society (e.g., females or minority groups). We are particularly interested in any employment-related affirmative action aimed at providing equal/greater access to professional opportunities, specifically to ensure that suitable qualified employees from designated groups have equal employment opportunity and are equitably represented in all occupational categories and levels. Measures may relate to recruitment, hiring, remuneration, development and career progression, and retention and could include any of the following: making reasonable accommodation for people from designated groups; identification and removal of barriers with an adverse impact on designated groups; the promotion of measures which promote diversity; development and training for designated groups (including skills development); and preferential treatment and numerical goals to ensure equitable representation.

[iii] **Employees**: All persons working for or affiliated with the central bank for pay, irrespective of type of contract, discipline, or level.

[iv] **Higher education:** All post-secondary education, including both public and private universities, colleges, technical training institutes, and vocational schools.

[v] **Open-ended contract:** An employment contract that has no termination date for the employee. Under this type of contract, job tenure is ambiguous, leaving the employee free to keep working as long as performance meets employer expectations.

[vi] **Fixed-term contract:** An employment contract that lasts for a specified period.

[vii] **Full-time employment:** For purposes of this survey, we follow the OECD and define full-time employment as employment in which a person works a minimum number of 30 hours per week. We recognize that individual banks may define full-time employment differently. When in doubt, we prefer the OECD definition.

[viii] **Part-time employment:** Normal hours of work are less than those of comparable full-time workers (see note v above).

[ix] **Newly hired:** Includes all employees hired, irrespective of type of contract, discipline or level, within the last twelve months.

[x] **Departed permanently:** Includes employees who retired, resigned, were fired or whose fixed-term contracts came to an end.

[xi] **Individual contributors:** Employees who do not have a managerial role.

[xii] **Lower/middle management:** A manager or supervisor of staff.

[xiii] **Senior management:** A manager of managers.

[xiv] **Annual, base salaries:** The annual sum of fixed regular payments, typically paid at weekly, biweekly, monthly or other intervals, made by the central bank to its employees. Excludes any ad hoc bonuses/performance pay or additional pecuniary benefits or payments (e.g., remuneration for working overtime; commissions, gratuities and tips received, housing or educational allowances, retirement benefits).

[xv] **Top and bottom 20% of annual, base salaries**:
Calculated as:

1) Rank your full-time employees from highest to lowest paid according to annual base salaries. See note viii above for a definition of annual base salaries.
2) Calculate: A = Annual base salary of the highest paid full-time employee minus the annual base salary of the lowest paid full-time employee.
3) Calculate: $B = A\ x\ \frac{20}{100}$.
4) Full-time employees that earn the top 20% of annual base salaries are the number of employees who earn annual base salaries between the highest annual base salary and the highest annual base salary minus B.
5) Full-time employees that earn the bottom 20% of annual base salaries are the number of employees who earn annual base salaries between the lowest annual base salary and the lowest annual base salary plus B.

[xvi] **The gender earnings ratio for the average of the bottom 20% of annual, base salaries:**

Calculate: $\frac{average\ annual\ base\ salary\ of\ all\ women\ identified\ in\ step\ 5\ in\ note\ xv\ above}{average\ annual\ base\ salary\ of\ all\ men\ identified\ in\ step\ 5\ in\ note\ xv\ above}$

[xvii] **The gender earnings ratio for the average of the bottom 20% of annual, base salaries:**

Calculate: $\frac{average\ annual\ base\ salary\ of\ all\ women\ identified\ in\ step\ 5\ in\ note\ xv\ above}{average\ annual\ base\ salary\ of\ all\ men\ identified\ in\ step\ 5\ in\ note\ xv\ above}$.

[xviii] **Annual leave:** Paid time off work granted by employers to employees on a recurring, annual basis to be used for reasons that are at the employee's discretion. Excludes public/national/legal holidays and leave accrued for working overtime or other types of leave linked to specific circumstances, e.g., maternity/paternity leave, sick leave, family care leave, family emergency leave, etc.

[xix] Average across all full-time employees.

[xx] **Flexible work hours:** Employees can opt to work hours that differ from the normal business hours of the central bank.

[xxi] **Telecommuting**: Employees can opt to work from home/an alternate location for some days/hours per week/month.

[xxii] **Compressed work schedule:** Employees can work the traditional number of hours per work week in less than the traditional number of workdays in order to free up days/time. For example, a full-time employee scheduled for 40 hours per week could work four 10-hour days instead of five 8-hour days.

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PUBLICATIONS

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