When are Women Elevated to Central Bank Boards? Institutions, Politics and Development*

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Abstract

In this paper I investigate systematically the prevalence of women in the top echelons of leadership of central banks. This includes top positions as central bank governors or presidents, as well as membership in, what I call generically, the central bank boards. The percentage of women in leadership positions in boards at the central banks in the 100 countries I code is somewhere around 10-15% for 2001-2013, although there is an upward trend. I use country and year fixed effects models and find that a larger share of women in the boards of central banks is more likely when: boards include more members; the percent of women in national legislatures is greater than 40 percent; the central bank has more independence; the exchange rate regime is flexible; and oil rents are low. On the other hand, surprisingly, democracies and PR electoral system countries reduce the share of women in central bank boards. Also, surprisingly, income and women's labor force participation does not affect the share of women in leadership position in central bank boards. .

* Please do not circulate or cite without the author's permission. The data used for the share of women in central bank boards for this paper is still in the process of being cleaned and results will likely need updating. Paper proposed for the 2017 Political Economy of International Organizations Conference. The author can be reached at bodeaana@msu.edu.

INTRODUCTION

Gender diversity and the gender gap in political office, declaring oneself as a candidate, earning a tertiary degree or being part of the boards of corporations are topics of increased concern. Countries address the gap with quotas reserving seats for women in parliaments or, even, the board of publicly traded firms. Political parties make pledges to include women on their candidate lists and universities pay attention to the graduation rates of women. Yet, gaps remain. In cabinet positions, women still hold fewer seats than men and these tend to be in positions with less prestige or usually associated with feminine characteristics (Krook and O'Brien 2012). Similarly, in 2014 the average international representation of women in national parliaments was at 22.3% (Lawless 2015). In the early 2010s companies' boards of directors included only 11.9% women in Europe and 9.9% in the Americas (Pande and Ford 2012). At the International Monetary Fund, while the having Christine Lagarde as the Managing Director, there are only three other women in leadership staff positions (out of 18).[1] Finally, related to the topic of this paper, only 34% of PhD degrees in economics were granted to women in 2011, the lowest percentage in social sciences.[2]

In this paper I investigate systematically the prevalence of women in the top echelons of leadership of central banks. This includes top positions as central bank governors or presidents, as well as membership in, what I call generically, the central bank boards. To the extent possible, I code the institutional body responsible for monetary policy. At different points in time, for different countries this may include the central bank governor and the deputy governors; the governor and the board of directors; the management; or the monetary policy committee / board. I also draw on theories explaining women appointment, representation and status to explore the underlying gender patterns of appointments to these central banks key positions. My data covers 100 countries for years 2001-2013.

Monetary policy and central banking tends to be a male dominated profession[3] and the lack of gender diversity is a recognized issue in the central banker profession. For example, in 2013, the European Central Bank announced that it aimed to roughly double the share of women in high raking administrative positions and has a gender diversity action plan.[4] This followed cries for gender diversity in 2012[5], when, until the appointment of Sabine Lautenschlager in 2014, the European Central Bank found itself with an all-male Executive

[1] As of September 2016, these are Sharmini Coorey (Institute for Capacity Development), Antoinette Sayeh (African Department), Susan Swart (Information Technology). With the exception of Christine Lagarde, none of these women are responsible for key IMF departments. http://www.imf.org/external/about/staff.htm

[2] https://www.richmondfed.org/~/media/richmondfedorg/publications/research/econ_focus/2013/q2/pdf/profession.pdf . The proportion of women is even lower in specializations like macroeconomics or finance, which are needed in many central banking positions, especially in the developed countries, where relevant advanced degrees are expected.

[3] http://www.ft.com/intl/cms/s/0/c79884ae-319c-11e3-817c-00144feab7de.html#axzz43qaovdzb

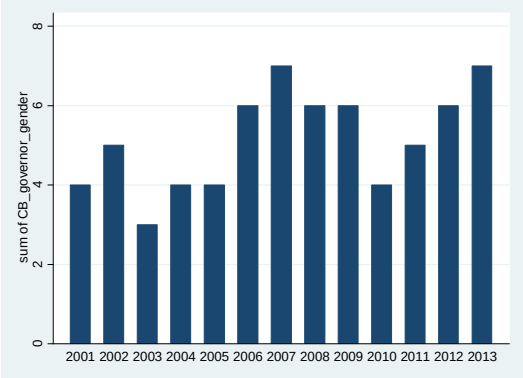
[4] The announcement said: "By the end of 2019, 35% of middle management positions (Heads of Division, Deputy Heads of Division, Heads of Section, Senior Advisers and Advisers) and 28% of senior management positions (Directors General, Deputy Directors General, Directors and Principal Advisers) should be held by women. The share of women in middle management positions at currently 17%, while women hold 14% of senior management positions". The ECB also currently has a web page dedicated to women at the institution: https://www.ecb.europa.eu/careers/working-at-the-ecb/women/html/index.en.html and has been organizing various events to attract female talent (FemaleTalent@ECB-Open Day 2016).

[5] http://www.voxeu.org/article/ecb-would-benefit-less-gender-discrimination

Board. Similarly, the Bank of England, between 2010 and the 2014 appointments of Nemat Shafik and Kristin Forbes had no gender diversity in the nine member Monetary Policy Committee. Also, the Bank of Japan in its over one hundred year old history has had only four women sitting in the nine member Policy Board, and none of these women held the post of Deputy Governor.[6] Sweden's central bank (Riksbank) is the oldest in the world, dating back to 1668, yet it has had no woman in the position of governor. The gender gap is much smaller in some central banks, with the Bank of Thailand being a prime example of an institution promoting women to leadership positions. Thus, the Thai central bank had Tarisa Watanagase as governor from 2006 to 2010, as well as two other female deputy governors out of a total of three deputies.[7]

The 2014 nomination and the subsequent appointment of the US Federal Reserve chair Janet Yellen gave the media an opportunity to note, for example, that developed countries face a greater gender gap in appointments to the central bank than developing countries. In 2015 there were a total of 16 female central bank governors or presidents (Diouf and Pepin 2015), of which the majority serve in developing countries[8]. The total number does not look abysmal, yet a historical investigation based on my newly coded data (Figure 1) shows that for years 2001-2013, the number of women holding the appointment of governor, chair or president of one of the 100 central banks I code is more likely to be in the low one digit numbers. Similarly, Figure 2 shows that the percentage of women in leadership positions in boards at the central banks in the same 100 countries remains somewhere around 10-15% for 2001-2013, although there is an upward trend. In terms of raw numbers there is more clear progress, as there were 55 women in leadership positions in 2001 (12 countries that appoint two or more females in central bank boards) and 100 in 2013 (25 countries that appoint two or more females in central bank boards) (Figure 2).

Figure 1. Average number of female central bank governors: 2001-2013; 100 countries



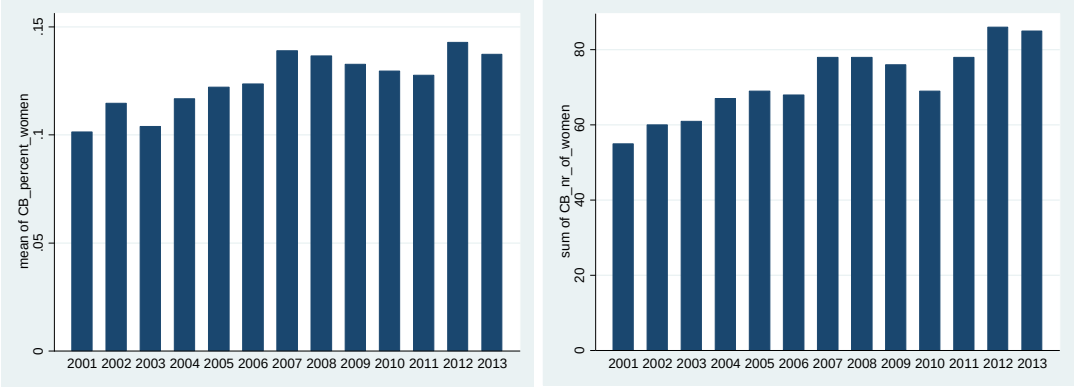
Note: In some central banks, the title may be president or chair.

[6] Takako Masai (appointed in 2016), Sayuri Shirai (appointed in 2011), Miyako Suda (appointed in 2001) and Eiko Shinozuka (appointed in 1998).

[7] Gender diversity at the Bank of Thailand is also reflected in the number of females for technical positions inside the central bank: http://www.bloomberg.com/news/articles/2014-11-24/in-battle-of-sexes-at-central-banks-thai-women-have-already-won .

[8] Some exceptions are Janet Yellen (US) or Karnit Flug (Israel).

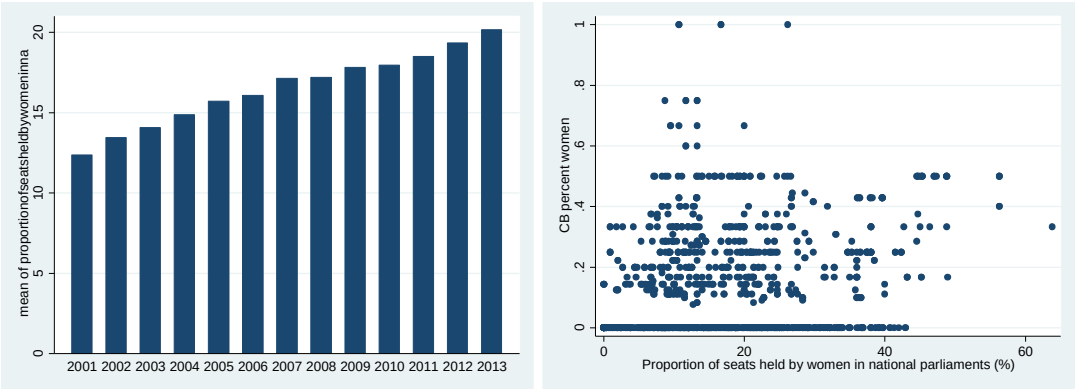
Figure 2. Percent women in central bank boards (yearly average); Number of women in central bank boards: 2001-2013; 100 countries



Note: There is variance on who is coded in a so called generic "central bank board". Depending on the country, the aim is to code the leadership of the central bank on monetary policy and that can include the governor and deputy governors; the governor and the board of directors; the management; or the monetary policy committee / board.[9]

In the politics and gender literature, a key outcome is women's participation in the electoral process and women's representation in national parliaments or in parties' leadership are key metrics to gauge participation. Figure 3 shows for the sample of 100 countries for which I have available the percentage of women in central bank boards, the average share of seats taken up by women in national parliaments[10]. From 2001 to 2013, the trend is similar to women in central bank boards, with a small increase of about seven percentage points, from about 13 percent to 20 percent. What is somewhat surprising is the absence of a simple linear correlation between the two measures: For plenty of central banks with a significant female representation in their national parliaments, there are no women in the central bank board. Only as women's representation in parliaments is greater than about 40%, does the association become positive.

Figure 3. Percent seats to women in national parliaments (yearly average); Correlation of the percent women in central bank boards and women's representation in national parliaments: 2001-2013; 100 countries



[9] The standard error of the average yearly percentage female appointments to central bank boards does not change much over years 2001-2013 and neither does the average number of members in the boards.
[10] Data is from the World Bank World Development Indications (WDI).

Janet Yellen's appointment opened renewed questions into why women are so highly under-represented in the central banking profession. Yet, there is little systematic investigation into the causes of the gender gap in the appointment of central bankers. There are several exceptions: Masciandaro et al. 2015 look at a simple cross section of the gender of monetary policy committees for year 2015, investigating the correlates of the gender of appointments. Diouf and Pepin (2015) investigate the appointment of central bank chairs (governors, presidents) in 46 countries since 1949[11], looking at the characteristics of countries that appoint female chairs.

Monetary policy and, consequently, the leadership team at the helm of central banks are immensely important for the economic conditions in a particular country. A focus on inflation versus a more balanced focus both on inflation and economic growth can make a large difference on average unemployment, and, also, on the unemployment of particular socio-economic groups. Women in positions of leadership in parties, governments or national legislatures have been shown to focus on issues of interest to women, bringing them into the public policy arena. Are women making different decisions in monetary policy than men and are there particular conditions that make gender balance in central bank boards more likely? We simply do not know because until this study we had no systematic, panel data on the gender composition of central bank boards, the decision-making bodies on monetary policy in central banks.

I use country and year fixed effects models and find that a larger share of women in the boards of central banks is more likely when: boards include more members; the percent of women in national legislatures is greater than 40 percent; the central bank has more independence; the exchange rate regime is flexible; and oil rents are low. On the other hand, surprisingly, democracies and PR electoral system countries reduce the share of women in central bank boards. Also, surprisingly, income and women's labor force participation does not affect the share of women in leadership position in central bank boards.

LITERATURE REVIEW

Low levels of female representation at the top echelons of business and government or low participation in politics may be a consequence of limited supply (Norris and Lovenduski 1993, Norris 1997; Paxton and Hughes 2007). Women may self-censure because they dislike becoming a managers or entering political competition and the process of reaching leadership positions, or they may face high costs or low ambition and motivation (Huffman and Cohen 2004). Theoretically, the supply of women for leadership positions or political office depends on a range of socio-economic factors (Hughes 2009) and may be mediated by the electoral process (Sanbonmatsu 2006), partisanship (Kenworthy and Malami 1999, Reynolds 1999, Wolbrecht 2000), ambition (Fox and Lawless 2011), aversion to the electoral process (Kanthak and Woon 2015) or existing descriptive representation and interaction rules (Karpowitz et al. 2012).

[11] Panel data analysis covers the period 1980-2014.

Alternatively, on the demand side (Lovenduski and Norris 1993, Terjesen et al. 2009), women may face discrimination, prejudice or social biases. Paxton (1997), for example, finds that female labor market participation or education do not influence their parliamentary representation. Thus, voters could be beholden to stereotypes (Hudy and Terkildsen 1993), cultural norms may be stacked against women (Norris and Inglehart 2001; Paxton and Kunovich 2003) or, in a relatively low information environment, candidate selectors could decide on abilities and qualifications based on perceptions rather than hard facts (Lovenduski and Norris 1993, Terjesen et al. 2009). For example, Niven (1998) finds that male party chairs prefer features associated with men and this effect may be reversed as the number of women in party leadership increases (Kittilson 2006), or a quotas push party elites to search harder for additional pools of recruits (Krook 2009).

Below, I look more specifically at the theories and factors behind countries using gender quotas, higher female representation in national legislatures / parties, and more gender balance in cabinet appointments. The ideas and empirical results are useful in thinking theoretically about the gender gap in the appointment of central bank leadership.

Since WWII, women have increasingly been in school, working outside the home or involved in political activism. Yet, as we pointed out important gender gaps remain. Gender equality in politics and business is a topic of great interest for governments, interest and professional groups, the public and media in countries around the world. Electoral gender quotas has been one of the ways in governments have promoted equality in elected office. Gender quotas can refer to policies that require setting aside seats in local or national elected bodies; to requirements that political parties include a certain percentage of women among the nominated candidates for public office; or the political parties voluntarily setting for themselves percentages of women candidates.[12] Although less prevalent, gender quotas are also present in business and several countries require firms to set aside seats for women in their corporate boards, including Finland, Norway, Spain, France and Malaysia, or Canada's Quebec region (Terjensen et al. 2009, Economist 2011[13], Guy et al. 2011)

A large literature studies the determinants of gender quotas for women in politics and points to domestic and international factors. Krook (2009) identifies four sets of explanations that include the mobilization of women themselves, elite strategic behavior[14], norms of fairness and equality (usually promoted by left wing parties or during periods of democratization), and international norms and norm diffusion[15]. Kittilson (2006) investigates women's integration in political parties and parliamentary offices in ten Western European countries (1975-1997), and quotas are made more likely by women's presence in high ranking party positions[16] or party competition.

The literature also discusses a number of cross country explanations for the variation in women's political representation. In developed countries several factors are shown to be important,

[12] Krook (2009) talks about reserved seats, party quotas and legislative quotas. There is significant variation in the nature of electoral quotas, with a large size differences (South Korea 50% vs. Nepal 5%) and enforcement (France's weak enforcement vs. Brazil's requirement to leave unfilled seats open) (Bush 2011).
[13] Economist July 21, 2011, "The wrong way to promote women". http://www.economist.com/node/18988506
[14] This factor may be more important in advanced industrial economies (Caul 2001).
[15] Bush (2011) shows that gender quotas are adopted by countries that receive foreign aid or undertake post-conflict peace operations.
[16] O'Brien (2015) investigates how women rise to party leadership positions.

including electoral institutions, partisanship and gender quotas. Thus, women are represented in greater numbers in countries with proportional representation (Lovenduski and Norris 1993), left wing governments (Caul 1999, Hughes 2004), legal mandates for gender quotas (Caul 2001, Paxton and Hughes 2015)[17] or international pressure to increase representation (Paxton et al. 2003). Across political regimes, democratic political institutions represent a broader range of interests, and, thus, could be expected to be related to increased female representation (Inglehart and Norris 2003). However, a number of cross-national studies do not find that democracies have more women represented in parliament (Paxton and Kunovich 2003, Paxton et al. 2006), and democratization may in fact reduce women's representation (Matland & Montgomery 2003).

A directly related literature investigates the gender patterns of appointment to executive positions. This work notes the dearth of women elected or appointed as president, prime minister or other cabinet position (Davis 1997, Reynolds 1999, Krook and O'Brien 2012, Jalalzai 2013, Thomas and Wilcox 2014). This work also notes the appointment of females to specific cabinet post like ministries of education or family / women's affairs or the appointment of "token" females to cabinet posts. In a recent article, Krook and O'Brien (2012) suggest that appointments may be a function of political institutions, gender equality, and women's political recruitment. Their findings indicate that a number of variable impact the gender composition and portfolio prestige of appointments to ministerial positions, including political institutions, although the presence of women in other elite positions was by far the most important determinant.

THEORY

A number of explanations can be related to the pattern of female appointments to leadership positions in central banks. I explore the role of token gender representation; political institutions; political party characteristics; socio demographic indicators related to a country's development; central bank features; and economic conditions.

The make-up of central bank leadership is a both a question of having a qualified pool of potential candidates as central bankers themselves would argue, but also, through the appointment process, a question of politics and representation. The central bank governor, its deputies, members of the boards of directors or monetary policy committee can be appointed by the legislature or by the executive branch. For example, in the US the President appoints members of the Board of Governors of the Federal Reserve and the Senate confirms the nominees. In Israel the President appoints the central bank governor on the recommendation of the Government, and monetary policy committee members are directly appointed by the Government. In Russia, the parliament (the Duma) appoints the Chairman of the Bank of Russia and the Board of Directors. In the UK the Government nominates the Governor of the Bank of England and members of the Monetary Policy Committee.[18]

[17] Quota research has recently focused on how the nature of quotas affect representation, including requirements to place women at the top of party lists or sanctions for party leaders for non-compliance with quota requirements.
[18] The Governor of the Bank of England is formally appointed by the Queen at the recommendation of the Government, and some of the Monetary Policy committee members are nominated by the Governor of the Central Bank.

Token female governors

A number of large central banks, like the ECB (six member Executive Board)[19] or the Bank of Japan (nine member Monetary Policy Board[20]) have had in their composition only one female governor at a time[21]. Many of these appointments have taken place in the face of media scrutiny and public discussions about the lack of gender diversity in central bank leadership. Central banks and their boards control, or, at a minimum, influence economic conditions in a particular country, both in terms of aggregate and distributional effects. Women would-be candidates for these central bank board seats could be perceived as less qualified, could have fewer political and central bank connections[22] and, altogether, could be perceived as more risky in terms of unknown preferences and reactions in monetary policy. Given, that seats in central bank boards are likely then to have an economic and political value, women candidates can be less of a sure bet. Thus, when there are more seats available to be filled, one particular seat in the central bank board is likely to be less politically valuable and "token" appointments are more likely. My hypothesis is therefore that women will be elevated to leadership positions in larger boards.

Political institutions

Democracy Inglehart and Noris' (2003) revised modernization theory argues that industrialization and democratization change social norms towards an acceptance of gender equality. Industrialization promotes women entering the work force, while democratization promotes social policies, and both processes promote an attitude shift in the role of gender. The caveat is that some cultural norms that center on patriarchal arrangements (Muslim societies) are less likely to progress towards gender equality. This theory suggest that the appointment of women in position of authority in central banks should be more prevalent in developed countries, democracies, countries with an improved socio-economic status for women and non-Muslim countries. Paxton (1997) also suggests that in democracies consistent and transparent rules should help women work through the political system to be in a position of authority. In some less democratic countries, on the other hand, women can be emancipated in the work place and in politics even when the society as a whole does not support the change.

Electoral system The electoral system is one the most important variables affecting women's representation in politics. With proportional representation, voters cast ballots for a party's candidate list and parties get legislative seats proportional to the votes they receive. Women are more likely to be represented in countries that have a PR electoral system. In general, more women make it to party lists than as candidates in single member districts. Similarly, in PR systems more women could be appointed to central bank boards, either directly,

[19] For the ECB I refer only to the Executive Board (EB) and not the whole monetary policy decision making body (Governing Council), of which the EB is part of. This is because the Governing Council is made out of the governors of the national central banks of the euro zone and these governors are elevated to their positions in national politics.

[20] The Monetary Policy Board dates back to the 1997 central bank reform, implemented in 1998.

[21] In the case of the ECB these are Sirka Hemeleinen (Finish), Gertrude Tumpel-Gugerell (Austrian), and Sabine Lautenschläger (German).

[22] "Where are the women in central banking?", Washington Post, September 19 2013; "A Study in Scarcity: Women at Central Banks", New York Times, October 8 2013.

because PR creates a culture in which gender diversity becomes expected or because PR brings more women to parliament and high government offices.[23]

Partisanship and electoral concerns

Left wing parties have generally embraced more egalitarian values and parties of the left have been associated with more political representation for women. The egalitarianism of left wing parties could also translate into the elevation of women to leadership positions in central bank boards. Equally important, election times can be periods when political parties cater to the electorate. Many times the appointment of women to leadership central bank positions is a highly discussed media issue. If attracting women's vote is a factor in parties' electoral strategy, then election years could see more appointments of women to central bank boards.

Development

Representation of women in national parliaments A large literature shows that elites act as gate keepers or enablers for gender balance in parties or candidate selection. Female elites could support female candidates by influencing list placement or party financial contributions and by further increasing women representation through internal party rules for percentages of women as candidates (Caul 1999, Kittilson 2006, Kunivitch and Paxton 2005). Similarly, more women parliamentarians could support the appointment or elevation within the central bank of female candidates. I expect that higher rates of representation in national parliaments translates into more women in central bank boards.

Women % of labor force & GDP/capita Going back to Inglehart and Noris' (2003) revised modernization theory, richer and industrial societies are more likely to exhibit social norms that accept of gender equality and women in the work force. Thus, my expectation is that richer countries and countries with more women that work outside of the home are likely to see more women in positions of leadership in their central banks.

Central bank governance

In the last three decades many countries around the globe allowed their central banks to be more independent from politics. This means that central banks could decide monetary policy without being responsive to politicians' popularity or re-election prospects. Demands for transparency in the central banks' operations came from the great power of central banks to affect the economy and lack of accountability conferred by independence from politicians.

Independence As discussed earlier women may present potentially more risk in terms of unknown monetary policy preferences. In this case, politicians may be reluctant to elevate or appoint women to central bank boards, due to the fact that independence protects to a great degree board members from politicians' influence or coercion. On the other hand, women may be thought to align themselves more readily with government preferences and be more dovish, given their traditional association with policies related to women's issues (Hudy and Terkildsen 1993, Masciandaro et al. 2015). Then, elevating women to leadership positions may be considered more dovish in terms of monetary policy preferences and thus governments could be

[23] O'Brien and Rickne (2016) show that gender quotas in Sweden, for example, increase the perception that women are qualified for political leadership.

more likely to favor women in central bank boards. In either case, if women are appointed or elevated to board positions, the interactions between the government and the central bank and the governance and functions of the central bank are likely to be relevant. My expectation with regards to central bank independence is therefore that it will likely affect central bank board gender balance, but the direction of this effect is ambiguous.

Transparency More transparent central banks are more likely to have a clear mandate (usually related to inflation and / or economic growth); explain what data is relevant for their deliberations; disclose their macro-economic model for policy analysis; publish macroeconomic forecasts; give an account of deliberations; promptly announce decisions on changes to policy instruments (e.g. interest rates), explain changes and give a sense of future changes. More transparent central banks are then likely to engage more with the public, beyond the usual engagement with the financial sector. In this case, it could be the case that more transparency raises the stakes that central bank boards be more representative and have more gender balance.

DATA AND RESEARCH DESIGN AND RESULTS

The data covers years 2001 to 2013 for 100 countries that I coded for the gender membership in central bank boards. To the extent possible or whenever there was a central bank reform I code the institutional body responsible for monetary policy. Because I go back to 2001, the main data source has been the Central Bank Directories 2002-2014 and I code each directory as showing the central bank personal from the preceding year. The panel structure of the data is attractive, yet, for particular countries, there are challenges to defining consistently across years the leadership of the central bank. One example is the Bank of Israel, where, while the Governor has the deciding stance or vote, monetary policy is decided successively by the Governor advised by a number of Senior Directors, the Governor advised by a monetary forum or the Monetary Committee (6 members, where the governor has the casting vote in the event of a tie).[24] A much easier case is the Bank of Japan, where after the bank reform of 1997 (implemented in 1998), I can code all the nine members of the Monetary Policy Board for the duration of my sample.

The number of central bank members across my sample varies tremendously and therefore it makes little sense to model the number of women members (average is close to 5 members, with a minimum of 1 and a maximum of 16). A more appropriate variable is therefore the proportion of women in the central bank board. The dependent variable is thus the number of female members in central bank boards (average 0.6, with a minimum of 0 and a maximum of 5) divided by the total number of board members. The proportion of women in the board averages 0.11%[25].

Independent variables: Democracy is operationalized with the polity score, ranging from -10 to 10, with positive numbers denoting democracies. Proportional representation comes from the Database of Political Institutions (DPI), and of 1 for countries with proportional representation electoral systems. GDP per capita; female labor force participation (percentage) and the proportion of seats held by women in national legislatures (percentage) are from the WDI. I use a dummy variable (value 1) to measure whether a country has a proportion of seats held by women

[24] Consequently, the number of members in the generic "central bank board" for Israel varied from four to eleven.
[25] 58 percent of country years have zero women in the central bank board.

in national legislatures greater than 40% (See Figure 3). I measure partisanship based on the DPI, and code a variable called left when the party of the chief executive is on the left. Elections are based on Hein Goemans' election dates dataset, NELDA (v3) and author corrections. The election variable is a dummy with a value of 1 for presidential and parliamentary elections. Central bank independence is the Cukierman et al, (1992) index from Bodea and Hicks (2015) and updated by the author[26]. The index ranges from 0 to 1, with larger values showing more independence. For transparency I use the measure of Eichengreen and Dincer (2010). The measure only covers the years 1998 to 2010 and values range from 1 to 14.5, with greater values showing more transparency.

Modeling the proportion of women in central bank boards presents two key challenges. The first is that unobservable factors drive the association between the independent variables in the egression models. I address this issue by using country and year fixed effects in all models[27]. The second issue is that the dependent variable is a proportion, taking values in between zero and one. I present therefore three types of models: a regular OLS model with robust standard errors; a generalized linear model (glm) with a a logit link and the binomial family, with robust standard errors[28]; and fractional response regression with a probit model for the conditional mean, specifically aimed at estimating outcomes like rates, proportions and fractional data.

In addition to the key independent variable I also include the country's the de facto exchange rate regime[29] and the country's history with inflation (in the past 10 years). The exchange rate regime controls for whether the country has a nominal anchor for inflation expectations that the central bank follows. The history of inflation can arguably capture a country's aggregate inflation preferences. Finally, I include the oil and gas rents per capita (Ross 2012), to capture the effect of natural resource exploitation on the number of women in the labor force and their loss of political influence (Ross 2009). Other controls of interest could be included in my models, but the lack of within country variation makes it impossible to estimate their effect. These include: % Muslim population; former colonial status; or the country's legal system.

Table 1 shows the average % women in central banks boards for several of our key independent variables. Two points stand out: First, the largest differences are seen for countries that have many women elected to national parliaments (above 40%), countries where women have joined the labor force in large numbers (above 44%) and central banks with large boards (above 4 members). Second, very surprisingly, democracies, countries with PR electoral systems and western (rich) nations do not have a higher percent of women in boards. Among the regions of the world Latin America stands out as the region with the highest % of women in central bank boads (18%), double the percentage of Western nations (9%).

[26] For euro zone countries the value of the CBI index codes the European Central Bank.
[27] Year fixed effects also help with autocorrelation, given that the dependent variable is slow changing.
[28] This model has predicted values between zero and one, consistent with the range of the dependent variable.
[29] We recode a standard measure (Reinhart & Rogoff 2004, Ilzetzki et al. 2008) such that 1 stands for de facto pegs and crawls (Ilzetzki et al. coarse coding 1, 2, 3). All other categories are coded as zero.

Table 1. Average of % Women in Central Bank Boards

	% Women in Central Bank Board
Autocracy - Polity<-5	6%
Anocracy	13%
Democracy - Polity>5	13.30%
PR	12.70%
Non-PR	13.70%
Left	14%
Non-left	12%
% Women in nat. Parliam >40%	31%
% Women in nat. Parliam <40%	12%
Female % labor force>Median (44%)	16%
Female % labor force< Median (44%)	9%
CBI>=CBI Median (0.56)	10.80%
CBI<CBI Median (0.56)	11.90%
CB Transparency> Median	13.00%
CB Transparency, Median	10.00%
Number of Board Members > 4 (Median)	14.00%
Number of Board Members < 4 (Median)	7%
Regions	
Western nations	9%
E Europe	12%
L America	18%
SS Africa	13%
Asia	11%
N Africa and Middle East	3%

Tables 2 and 3 (below) show the results of the more rigorous country and year fixed effects regression models. In Table 3 I add the central bank transparency index, which severely limits the sample size: The number of observations drops from 1089 to 807. Models 1 and 4 are OLS models, Models 2 and 5 are glm models with a logit link, and Models 3 and 6 are fractional response regressions with a probit model for the conditional mean.

One of the most robust findings in these models is that large boards will see a greater proportion of women elevated to a leadership position. The coefficient on the number of board members is positive and statistically significant across all six models. This does support the idea that women will be appointed to boards when then value of a single seat is lower.

Controlling for GDP/ capita (which is statistically insignificant across all models), political democracy and PR electoral systems, in fact, reduce the share of women in central bank boards. The coefficient on Polity is negative and statistically significant in five out of sox models, while PR's coefficient is negative and statistically significant in all five models. These findings are inconsistent with the modified modernization theory, and more representative political institutions do not appear to contribute to elevating a higher share of women to leadership positions in central banks, although they may have a positive effect through political representation. This is because, countries where the percent women in national legislatures is above 40, also see a larger share of women in central banks. Very importantly, however, there is no linear effect of the percent women in national legislatures, and, similarly, smaller percentages of representation in legislatures do not raise the share of share of women in central banks. The left variable is in the predicted direction (increases the share of women in central bank boards), but is only statistically significant in the smaller sample models where central bank transparency is also included. Central bank independence (CBI) has a similarly positive and statistically significant effect that holds across all six models. Of the control variables, both the exchange rate regime and oil rents are statistically significant in several of the models: Countries with fixed exchange rates and more oil rents tend to see a smaller share of women in central bank boards. Finally, surprisingly, income and women's labor force participation does not affect the share of women in leadership position in central bank boards.

CONCLUSION

In this paper I investigate systematically the prevalence of women in the top echelons of leadership of central banks. This includes top positions as central bank governors or presidents, as well as membership in, what I call generically, the central bank boards. The percentage of women in leadership positions in boards at the central banks in the 100 countries I code is somewhere around 10-15% for 2001-2013, although there is an upward trend. I use country and year fixed effects models and find that a larger share of women in the boards of central banks is more likely when: boards include more members; the percent of women in national legislatures is greater than 40 percent; the central bank has more independence; the exchange rate regime is flexible; and oil rents are low. On the other hand, surprisingly, democracies and PR electoral system countries reduce the share of women in central bank boards. Also, surprisingly, income and women's labor force participation does not affect the share of women in leadership position in central bank boards.

Some policy implications follow from these findings: Countries like Japan who proclaim a desire to elevate the status of women in politics and the job market have a way to go in achieving gender balance in their central bank. Currently the share of women in the lower house of the Japanese parliament stands at a meager 9.5 percent, and the percent of women in government in government jobs is 3.5%.[30] My work suggests that political representation by women legislators in Japan must increase significantly to have more than token elevation of women to powerful leadership positions in the Bank of Japan's Monetary Policy Board.

[30] Japan's female lawmakers are way behind Saudi Arabia's; CNN Money September 29, 2016. http://money.cnn.com/2016/09/29/news/economy/japan-women-government/index.html

Table 2

DV: % Women in CB Board	OLS	GLM Logit link	Fractional Resp. Reg
	Country & Year FE	Country & Year FE	Country & Year FE
	Model 1	Model 2	Model 3
CB nr. of board members	0.009	0.094	0.059
	(2.78)**	(3.64)**	(4.33)**
Polity2	-0.010	-0.072	-0.043
	(1.61)	(2.26)*	(2.44)*
PR	-0.211	-1.582	-0.999
	(8.91)**	(3.68)**	(4.18)**
Ln(GDP/capita)	0.005	0.195	0.226
	(0.06)	(0.35)	(0.74)
% Female in Labor Force	-0.009	-0.041	-0.024
	(1.30)	(0.81)	(0.87)
% Women in parl.>40%	0.047	0.527	0.324
	(1.42)	(1.98)*	(2.11)*
Left	0.012	-0.004	0.013
	(0.57)	(0.03)	(0.18)
Elections	-0.004	-0.044	-0.031
	(0.63)	(0.54)	(0.69)
CBI	0.221	2.858	1.666
	(1.79)	(3.67)**	(3.81)**
Ln(inflation past 10 years)	0.000	-0.027	-0.003
	(0.01)	(0.24)	(0.06)
Fixed ER	-0.034	-0.459	-0.271
	(1.46)	(2.06)*	(2.24)*
Oil&gas value/capita	-0.0001	-0.0001	-0.0001
	(0.87)	(3.14)**	(3.03)**
Cons	0.461	-3.442	-3.190
	(0.52)	(0.51)	(0.87)
R^2	0.13		
N	1,079	1,079	1,079

Note: * $p<0.05$; ** $p<0.01$.

Table 3.

DV: % Women in CB Board	OLS	GLM Logit link	Fractional Resp. Reg
	Country & Year FE	Country & Year FE	Country & Year FE
	Model 4	Model 5	Model 6
CB nr. of board members	0.011	0.096	0.061
	(2.77)**	(3.24)**	(3.89)**
Polity2	-0.015	-0.116	-0.073
	(2.58)*	(4.30)**	(4.84)**
PR	-0.253	-1.949	-1.198
	(14.94)**	(3.47)**	(3.94)**
Ln(GDP/capita)	-0.012	0.242	0.208
	(0.12)	(0.39)	(0.61)
% Female in Labor Force	-0.015	-0.065	-0.041
	(2.25)*	(1.19)	(1.37)
% Women in parl.>40%	-0.074	-0.607	-0.329
	(1.71)	(1.51)	(1.46)
Left	0.061	0.564	0.338
	(3.03)**	(3.70)**	(4.06)**
Elections	-0.007	-0.098	-0.058
	(0.81)	(1.05)	(1.13)
CBI	0.254	3.038	1.731
	(1.62)	(3.28)**	(3.44)**
Ln(inflation past 10 years)	0.001	0.055	0.032
	(0.19)	(1.06)	(1.16)
Fixed ER	0.007	0.065	0.046
	(0.57)	(0.52)	(0.79)
Oil&gas value/capita	-0.028	-0.524	-0.298
	(1.40)	(1.70)	(2.00)*
Cons	-0.000	-0.000	-0.000
	(1.63)	(4.32)**	(4.32)**
R^2	0.806	-3.860	-2.755
	(0.87)	(0.52)	(0.68)
R^2	0.19		
N	807	807	807

Note: * $p<0.05$; ** $p<0.01$.

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