Appointements to central bank boards : does gender matter ?

Patricia Charléty, Davide Romelli, Estefania Santacreu-Vasut

ESSEC BUSINESS SCHOOL

APPOINTMENTS TO CENTRAL BANK BOARDS: DOES GENDER MATTER?

RESEARCH CENTER
PATRICIA CHARLETY, DAVIDE ROMELLI, ESTEFANIA SANTACREU-VASUT

ESSEC WORKING PAPER 1616

SEPTEMBRE 2016

Appointments to Central Bank Boards: Does Gender Matter?

Patricia Charlety*
Davide Romelli**
Estefania Santacreu-Vasut***

September 15, 2016

Abstract

This paper provides the first systematic analysis of the evolution of female and male appointments to central bank boards. We build a novel and unique dataset that tracks appointments and replacements in a balanced panel of 26 OECD central bank boards from 2003 to 2015. We find that the likelihood of appointing a female is higher when a female rather than a male is being replaced and lower when the percentage of women on the board is already high.

Keywords: Boards, Central Banks, Financial Crisis, Gender, Governance

JEL: E5, G2, G3, J16

*ESSEC Business School and THEMA, France. **Trinity College Dublin, Ireland. *** Corresponding author. santacreuvasut@essec.edu. ESSEC Business School, Economics department, 1 Avenue Bernard Hirsch, Cergy-Pontoise, France.

1. Introduction

The nomination of Janet Yellen as chair of the Fed in 2013 was perceived as a turning point in "the history of female central bankery" (Amie Tsang, Financial Times, 2013). Other central banks have recently appointed women, such as Karnit Flug, who was named head of the Bank of Israel. Despite recent female appointments to central banks, Gillian Tett describes central banking as "a man's world" (Financial Times 2013). Supporting this view, in October 2012, renowned economists signed an open letter denouncing the absence of women appointed to the European Central Bank (ECB) executive board (voxeu.org, 2012). Interestingly, in January 2014, Sabine Lautenschlger was appointed to the ECB board after the European Parliament refused to schedule a hearing for the candidate initially selected by the ministers of finance, a candidate who happened to be a man. Yet, the absence of females on central bank boards is still pervasive. As of January 2016, there were 31 female central bank board members among 26 OECD countries, representing only 14% of board members. Is central banking "a man's world"?

In this paper, we address this issue by investigating the pattern of appointments to central bank boards from 2003 to 2015 in 26 OECD countries. To do so, we build a novel and unique dataset that tracks the entire set of female and male appointments to the boards of central banks in a given year. These data allow us to disentangle whether appointees are replacing departing members or whether they represent additions to the board. We investigate the likelihood of appointing a female based on the gender of the departing member(s) and the share of females on the board. The pattern of appointments reveals that gender matters. In particular, we show that the likelihood of appointing a female is higher when a female board member is being replaced and lower when the percentage of females on the board is already high.

Our results complement those in the corporate governance literature. Within this literature, our paper is closely related to Farrell and Hersch (2005). They study additions to corporate boards in the US from 1990 to 1999 and show that the likelihood of adding a woman to a company's board is negatively influenced by the number of women already serving as board members. They also show that the probability of adding at least one female to the board is maximized when a female director leaves the board.

Central bank boards differ from corporate boards for a number of reasons. First, in most central banks, board members' terms are staggered. This implies that not all board members are replaced at once. This setting allows us to identify instances when only one member is being replaced, which we call a "unique replacement". Our data reveal that in the set of 76 unique replacements, there have been 10 female appointments and 66 male appointments. We find that the predicted probability of appointing a female is 37% when the departing member is female and 9% when the departing member is male. Second, central bank boards are significantly smaller than corporate boards. We also investigate whether size matters and find that it does not, except for the fact that female appointments are more likely to represent net additions to a board rather than replacements, thereby increasing the actual size of the board. Interestingly, the same type of result is found for corporate boards (Carter et al., 2003). Otherwise, when holding the size of the board constant, we do not find an effect of board size on the pattern of female appointments. Third, central banks around the world share similar objectives but operate under different economic, institutional and

cultural environments. These differences lead us to consider a series of robustness checks that take into account such differences. Since our sample spans the 2003-2015 period, we also check whether our results are robust to controlling for the financial crisis.

Our research contributes to the scant literature on gender diversity in central banks. Farvaque et al. (2011) study how the background characteristics of central bankers, including gender, correlate with the central bank's inflation management policies. In particular, they look at the share of females on the central bank boards of 9 OECD countries and find that gender seems to play a role in monetary policy. These authors find that a higher share of female members is associated with lower inflation levels. While their study focuses on the consequences of central bankers background, we study the patterns of appointment. Similarly, Masciandaro et al. (2015) conduct a cross-country analysis of gender diversity in central banks in 2015. They investigate the country-level determinants that explain variations across countries, as well as the consequences, in terms of monetary policy, of gender diversity. To the best of our knowledge, no studies have yet studied the pattern of appointments over time. Since central banks have staggered terms, studying female representation on boards in a given year may offer a partial view of the actual gender diversity of a board. Most of the research on central bank governance focuses on the consequences of board characteristics (size, structure) for policy making (see Erhart et al., 2010; Koetter et al., 2014) but does not consider gender diversity.

On the contrary, gender diversity in the boardroom is a "hot topic" in the corporate governance literature. Indeed, the literature focuses mostly on corporate boards. As Hermalin and Weisbach (2003) argue, "the governance of organizations other than for-profit corporations is a relatively unexplored area". Within the corporate governance literature, our analysis is closest in spirit to Farrell and Hersch (2005), as previously discussed. While their study focuses on the pattern of appointments to corporate boards in the US, our sample covers 26 OECD countries and shows that gender bias in the pattern of appointments is present not only in the corporate world but also in central banks. Further, we show that these biases are not country specific. More generally, we contribute to the rich literature on gender diversity in the boardroom (see Adams and Ferreira, 2009; Ahern and Dittmar, 2012) and, within that literature, on gender diversity determinants (Adams and Kirchmaier, 2015; Santacreu-Vasut et al., 2014).

This paper is structured as follows. In section 2, we describe the data. In section 3, we present the empirical results. In section 4, we provide a series of robustness checks. Section 5 concludes.

2. Data

This section describes the methodology we followed to build the data set used in the paper.

Central bank websites provide information such as the names of the members of the board, including the governor. However, only a few central banks provide information about former governors and board members.[1] Therefore, whenever the historical evolution of a central

[1]Our analysis focuses on the board responsible for implementing monetary policy in the country or the board responsible for implementing the directives of the European Central Bank at the national level in the

bank board was not available on the institution's website, we recovered this information using the Internet Archive, which provides free public access to archived websites. Using these data, we reconstruct the composition of central bank boards over time.

Most central banks in advanced economies created their websites between the end of the 1990s and the early 2000s. We use 2003 as our starting point to obtain a balanced panel for a significant number of countries. Overall, our dataset contains information on 507 current and former central bankers. We collected the name and gender of each of these members. Over the 2003-2015 period, there were 78 female members.

To sum up, our dataset includes information on appointments to central bank boards from 2003 to 2015 in 26 OECD countries. Table A1 in the Appendix lists the countries included in our sample, as well as the average number of board members, including females, during the study period.

Table 1 presents the breakdown of the number and percentage of female on the central bank boards in our sample from 2003 to 2015. As the table shows, the percentage of women on boards increased from 10.70% in 2003 to 14.48% in 2015. Table 1 also reports the percentage of central banks with no women on the board, which was 42% in both 2003 and 2015. Further, the percentage of central bank boards with one woman declined from 42% in 2003 to 23% in 2015. On the contrary, the percentage of central banks with two (or more) female members on the board has increased from 15% in 2003 to 34% in 2015. This explains the increase in the percentage of females despite the number of central bank boards that have remained entirely male.

case of central banks of eurozone countries.

Table 1: Breakdown of number or percentage of female on the board by year

Year	Nr	Board size	Average number of women on the board	Percentage of women on the board	Percentage of central banks with no women on the board	Percentage of central banks with one women on the board	Percentage of central banks with two or more on the board
2003	26	6.81	0.85	10.70%	42.31%	42.31%	15.38%
2004	26	6.81	0.88	11.23%	38.46%	46.15%	15.38%
2005	26	7.08	0.92	10.86%	42.31%	34.62%	23.08%
2006	26	7.04	0.92	10.47%	46.15%	30.77%	23.08%
2007	26	7.15	0.92	10.37%	42.31%	34.62%	23.08%
2008	26	7.12	1.04	12.32%	34.62%	42.31%	23.08%
2009	26	6.96	1.04	12.86%	34.62%	38.46%	26.92%
2010	26	6.69	1.00	13.25%	38.46%	38.46%	23.08%
2011	26	6.54	0.96	13.17%	38.46%	34.62%	26.92%
2012	26	6.54	0.92	11.26%	50.00%	19.23%	30.77%
2013	26	6.54	0.96	11.99%	42.31%	30.77%	26.92%
2014	26	6.58	1.15	13.88%	42.31%	23.08%	34.62%
2015	26	6.58	1.19	14.48%	42.31%	23.08%	34.62%

Table 2: Descriptive statistics

	Mean	St. deviation	Min	Max
Number of female appointments	0.174	0.459	0	3
Number of male appointments	0.847	1.196	0	7
Number of female departures	0.138	0.387	0	2
Number of male departures	0.832	1.274	0	8
Board size	6.72	3.12	1	15
Number of female board members	0.982	1.073	0	5
Percentage of female board members	12.07%	0.128	0%	60%

Table 2 presents descriptive statistics for the average central bank throughout the 2003-3015 period. It has 0.982 female board members. The sample minimum value is 0, and the maximum value is 5. We also show statistics for the main variables used in the empirical analysis that are related to appointments and departures. In particular, the average number of female appointments is 0.174, much lower than the average number of male appointments of 0.847. Interestingly, the average number of departures by gender displays a similar pattern. That is, the average number of female departures is 0.138, which is lower than the average number of male departures of 0.832. Whereas the figures are of the same magnitude, they show a tendency to increase for women.

In the empirical analysis, we also control for the percentage of female board members, which has a mean value of 12%. The legislation governing the central bank stipulates the size of the board. In our sample, the average board size is 6.72. As previously mentioned, central bank boards are smaller than corporate boards.[2] Board size may vary because of de jure size ranges or de facto size changes. This means that when analyzing whether the pattern of board member appointments is gender biased, we need to distinguish between appointments that lead to changes in the size of the board and those that are "pure replacements". We take this difference into account in the empirical analysis by restricting the sample to appointments that do not lead to changes in board size.

Interestingly, the replacement of central bank board members takes place sequentially, since most central banks have staggered terms. In our sample, 7 central banks have de jure staggered terms, while the legislation governing the remaining banks does not specify this pattern. Yet, the data on board appointments reveal that many central banks have de facto staggered terms as well. A staggered term contrasts with the corporate world, where all directors may stand for (re)election at annual meetings.

Regarding the terms of office, there is substantial heterogeneity regarding board members terms, ranging from as few as 3 years in the UK to as many as 14 years in the US. These interesting features of central bank boards allow us to identify instances of "unique replacements". That is, instances where a single member of the board departs and is uniquely replaced. This allows us to examine whether the pattern of replacement is gender biased more accuracy. Table 3 shows the percentage of "unique replacements" as just described.

As Table 3 shows, there are many more male appointments than female ones. Yet,

[2]Within the corporate board literature, small boards are generally perceived as more efficient. Future work may explore this issue in central bank boards, but it is beyond the scope of this paper.

Table 3: Gender patterns in unique replacements (absolute values)

		Appointments	
		F	M
Departures	F	4	8
	M	6	58

conditional on the gender of the departing member, female appointments are more likely when a female departs (33%) than when a male departs (9%).

Staggered terms and board size legislation, therefore, have a direct bearing on our empirical strategy, which consists of analyzing the pattern of female appointments (and departures) in a given year rather than focusing on the overall share of women on the board. This specificity represents an advantage from an empirical strategy stand point because we can clearly identify whether the pattern of appointments is gender biased.

3. Empirical Results

We use a balanced panel consisting of 26 countries for which we have data on board members and board member appointments and departures for the 2003-2015 period. Our main dependent variable is the number of female and male appointments. Yet, considering the number of female and male appointments in a given year does not allow us to distinguish between actual replacements and additions that change the size of the board. Indeed, when more than one board member is appointed, it is not clear whether a female or male replaces a female or male board member. To address these issues, we replicate our analysis restricting the sample to appointments occurring in years during which board size stays constant and to the sample of appointments where only one member is being replaced. Our control variables include the number of female and male departures, the percentage of females on the board and the size of the board. We control for country fixed effects in the main analysis.

Table 4 presents our main empirical results. Columns (1) and (2) display the results of the regressions using the number of female and male appointments, respectively. We use a Poisson model to capture the fact that in a given year, only some central banks appoint new members. Columns (3) and (4) replicate the results using a Poisson model but restricting the sample to instances when the appointments do not lead to changes in board size for the reasons previously discussed. We call this the "pure replacements" sample. Finally, in column (5), we restrict our sample to unique replacements. That is, to instances where a single member departs and a single member is appointed. We call this the "unique replacement" sample. In this case, our dependent variable is a dummy variable equal to one if a female is appointed and equal to zero if a male is appointed. Furthermore, we use a dummy equal to one if a female departs and zero if a male departs. In this specification, we use a logit model, which is better suited to the binary structure of our dependent variable.

As Table 4 shows, the likelihood of a female appointment is positively and significantly related to female departures and, to a much smaller extent, to male departures. Interestingly, female and male departures have roughly the same influence (in sign and magnitude) on male appointments. The percentage of females on the board, both in the full sample and in the

Table 4: Appointments of female and male to central bank boards 2003-2015

	(1)	(2)	(3)	(4)	(5)
	Full sample		*Pure replacements*		*Unique replacements*
	Female	Male	Female	Male	Female
Female Departures	1.3582***	0.3169**	1.8527***	0.7306***	1.8203**
	(0.278)	(0.152)	(0.423)	(0.194)	(0.902)
Male Departures	0.4381***	0.4705***	0.6503***	0.6379***	
	(0.089)	(0.038)	(0.141)	(0.057)	
% of Female on Board	-7.1123***	0.5938	-7.2282***	1.4066	-1.5855
	(2.086)	(0.888)	(2.542)	(1.062)	(3.733)
Board Size	0.3419***	0.1068	0.0386	-0.0892	-0.0282
	(0.124)	(0.067)	(0.328)	(0.122)	(0.140)
Observations	327	327	284	284	76
Number of Countries	26	26	26	26	25

Notes: Constant terms are included but not reported. Standard errors in parentheses. *** denotes significance at the 1% level, ** denotes significance at the 5% level, * denotes significance at the 10% level.

Columns (1)-(4) report the results of Poisson estimation model using the number of females and males appointed using country fixed effects. In columns (3)-(4), we restrict the sample to instances where the appointees replace departing members and do not change the size of the board. Column (5) reports the results of a logit estimation model using the sample of instances where only one member is replaced. The dependent variable equals one if a female is appointed and zero if the appointed member is a male. Control variables are described in the main text. In column (5), female departures is a dummy variable since we consider a sample of unique replacements.

pure replacement one, has a very negative and significant impact on female appointments, while it has no significant impact on male appointments. In the sample of unique replacements, the impact of the percentage of females on the board is still negative but no longer significant. Finally, board size has no impact on appointments except when we consider female appointments in the full sample. This suggests that some of the female appointments represent additions rather than replacements. Overall, these results indicate that gender matters in the pattern of appointments to central bank boards, with female appointments being more likely when the departing member is a female.[3]

To assess the quantitative impact of female and male departures on female and male appointments, we estimate the predicted probability of appointing a female or a male as a function of the gender of the departing member. We do this for the unique replacement sample only, since in this sample, we can unambiguously pinpoint the gender mix of a given actual replacement. Calculating predicted probabilities also allows us to evaluate the goodness of fit of our model in comparison to the actual replacements presented in Table 3.

Table 5 presents the predicted probabilities based on the Table 4 coefficients as function of the gender of the departing member. We evaluate all other control variables at their mean

[3]To test the robustness of our results, we implement the same analysis by adding time fixed effects. These results, not included here but available upon request, are qualitatively similar

Table 5: Predicted probabilities of female and male appointments to boards 2003-2015 as function of departing member gender. Unique replacements sample.

	Probability of appointing a female	Probability of appointing a male
Female Departure=0	0.089	0.911
Female Departure=1	0.377	0.623

levels.

All predicted probabilities are significant at least at the 5% level. First, as Table 5 shows, the probability of appointing a female is always smaller than the probability of appointing a male. However, the probability of appointing a female is much higher when a female, rather than a male, departs. In our model, the probability of appointing a female is 37% when a female departs, while in the data (Table 3), females are appointed 33% of the time in such cases.

The probability of appointing a male is (91%) when a male departs and 62% when a female departs. In the data (Table 3), males represent 90% of appointments when a male departs. Overall, these numbers reveal that the pattern of appointments is gender-biased and that our model predicts this pattern well. We now check the robustness of our results.

4. Robustness Checks

4.1. Country-specific factors

In this section, we extend the main analysis to include country-specific characteristics. In particular, Table 6 replicates the baseline analysis using the full sample and controlling for the cultural and institutional characteristics of a country. In particular, in Column (1), we control for the percentage of female seats in parliament (World Bank, 2014). In Column (2), we control for whether the dominant language in the country is sex based (SBII). To do so, we use the World Atlas of Language Structures (Dryer and Haspelmath, 2011; and Corbett, 2011). Indeed, recent research suggests that gender in language captures cultural influences from the past that reflect gender inequality (Gay et al., 2016). In Column 3, we control for the degree of central bank independence. In particular, we use the dynamic index of central bank independence proposed in Romelli (2016) [ECBI]. Column (4) includes a Catholic country dummy variable (Maoz and Henderson, 2013). In Column (5), we control for a civil law dummy variable (La Porta et al., 1999). We present the results only for the appointment of a female. Since we control for country characteristics, we eliminate country fixed effects.

As Table 6 shows, our results are robust to controlling for these country characteristics. Interestingly, none of these country variables is significant, which suggests that central banks and their boards are "special" institutions whose patterns of appointments respond to an internal logic that is gender biased but that does not necessarily reflect local cultural and institutional factors related to gender inequality. These factors may play a smaller role than expected because the 26 OECD countries in our sample are relatively homogeneous

Table 6: Country-level factors and appointments to central bank boards 2003-2015.

	(1)	(2)	(3)	(4)	(5)
Female Departures	1.0259***	0.9636***	0.9025***	1.0056***	0.9789***
	(0.265)	(0.273)	(0.294)	(0.269)	(0.267)
Male Departures	0.3384***	0.3202***	0.2827***	0.3255***	0.3279***
	(0.073)	(0.073)	(0.071)	(0.072)	(0.070)
% of Female on Board	-2.1643	-1.8533	-0.9817	-2.0525	-1.4182
	(1.830)	(1.978)	(2.379)	(1.925)	(2.002)
Board Size	0.2183***	0.1939**	0.1618*	0.2006**	0.1889**
	(0.079)	(0.077)	(0.088)	(0.078)	(0.075)
% of seats	0.0289				
by women in parliament	(0.020)				
SBII		-0.0070			
		(0.472)			
Central Bank			0.3827		
Independence			(0.845)		
Catholic Dummy				-0.2051	
				(0.400)	
Civil Law					0.3566
					(0.379)
Observations	327	314	301	327	327
Number of Countries	26	25	26	26	26

Constant terms are included, but not reported. Standard errors in parentheses. *** denotes significance at the 1% level, ** denotes significance at the 5% level, * denotes significance at the 10% level.

in terms of religious background (most are Catholic or Protestant). Similarly, central bank independence has remained fairly constant throughout the period.

4.2. The financial crisis

We now consider whether our results are robust to the financial crisis, since this was a major economic phenomenon during the study period (2003-2015). To do so, we replicate our empirical analysis and add a crisis dummy that signals the presence of a systemic banking crisis during the previous two years. The dates of the crises come from Laeven and Valencia (2013). Since this variable is time variant, we control for country fixed effects.

Furthermore, following the financial crisis, public commentators speculated that a lack of females in the financial sector may have contributed to the crisis. If only Lehman Brothers

Table 7: Financial crisis and appointments to central bank boards 2003-2015.

	(1)	(2)	(3)	(4)	(5)
	Full sample		*Pure replacements*		*Unique replacements*
	Female	Male	Female	Male	Female
Female Departures	1.2956***	0.3189**	1.7663***	0.7311***	1.6947*
	(0.287)	(0.154)	(0.425)	(0.197)	(0.928)
Male Departures	0.4398***	0.4706***	0.6511***	0.6379***	
	(0.089)	(0.038)	(0.139)	(0.057)	
% of Female on Board	-7.1935***	0.5934	-6.8226***	1.4039	-1.3767
	(2.125)	(0.888)	(2.598)	(1.074)	(3.793)
Board Size	0.3539***	0.1061	0.0535	-0.0893	-0.0816
	(0.128)	(0.068)	(0.367)	(0.122)	(0.158)
Financial Crises	0.3142	-0.0136	0.5372	-0.0031	2.0763***
	(0.388)	(0.167)	(0.466)	(0.186)	(0.787)
Observations	327	327	284	284	76
Number of Countries	26	26	26	26	25

Notes: Constant terms are included but not reported. Standard errors in parentheses. *** denotes significance at the 1% level, ** denotes significance at the 5% level, * denotes significance at the 10% level.

Columns (1)-(4) report the results of a Poisson estimation model using the number of female and male appointed and country fixed effects. In columns (3)-(4), we restrict the sample to instances where the appointees replace departing members and do not change the size of the board. Column (5) reports the results of a logit estimation model for a sample of instances where only one member is replaced. The dependent variable equals one if a female is appointed and zero if the appointed member is a male. The control variables are described in the main text. In column (5), female departures is a dummy variable since we consider a sample of unique replacements.

had been Lehman Sisters, as Adams and Ragunathan (2015) suggest, the crisis might have been averted. It is therefore important to check whether the financial crisis had any impact on the pattern of appointments not only for robustness but also in its own right.

Table 6 replicates the results of Table 4 but adds the financial crisis variable as an additional control. The results show that the pattern of appointments to boards is robust to controlling for the financial crisis.

4.3. Outliers

Finally, we exclude outlier countries, such as Austria, Denmark, Estonia and Mexico, from our empirical analysis to make sure these are not driving our results. These countries are characterized by boards that have been entirely male throughout the period. Table 8 replicates our main analysis excluding these outlier countries. Excluding outlier countries does not change our results. The results are virtually identical in terms of economic and statistical significance.

Table 8: Excluding outliers. Appointments to central bank boards 2003-2015.

	(1)	(2)	(3)	(4)	(5)
	Full sample		*Pure replacements*		*Unique replacements*
	Female	Male	Female	Male	Female
Female Departures	1.3582***	0.3212**	1.9131***	0.6807***	1.7543**
	(0.278)	(0.150)	(0.381)	(0.197)	(0.891)
Male Departures	0.4381***	0.4455***	0.6621***	0.5906***	
	(0.089)	(0.038)	(0.126)	(0.058)	
% of Female on Board	-7.1125***	0.5601	-7.5886***	1.4209	-2.4183
	(2.086)	(0.881)	(2.437)	(1.085)	(3.695)
Board Size	0.3419***	0.1097	0.0145	-0.0939	-0.0814
	(0.124)	(0.067)	(0.297)	(0.122)	(0.144)
Observations	277	277	235	235	67
Number of Countries	22	22	22	22	22

Notes: Constant terms are included but not reported. Standard errors in parentheses. *** denotes significance at the 1% level, ** denotes significance at the 5% level, * denotes significance at the 10% level.

Columns (1)-(4) report the results of a Poisson estimation model using the number of female and male appointed and country fixed effects. In columns (3)-(4), we restrict the sample to instances where the appointees replace departing members and do not change the size of the board. Column (5) reports the results of a logit estimation model in a sample of instances where only one member is replaced. The dependent variable equals one if a female is appointed and zero if the appointed member is a male. The control variables are described in the main text. In column (5), female departures is a dummy variable since we consider a sample of unique replacements.

5. Conclusion

The absence of women among central banks' top managers, as well as in the economy more broadly, has led the IMF, under the leadership of Christine Lagarde, to warn about the negative consequences of slow progress toward gender equality for growth and development. While recent initiatives relying on quotas to promote women to listed companies' boards exist in a variety of countries, little is done to promote female presence on central bank boards.

This paper helps uncover the pattern of appointments to central bank boards and reveals that this pattern is gender biased. Thanks to the specificity of appointment rules in central banks, including staggered terms, we can perfectly identify instances when a departing member is uniquely replaced. To sum up, we find that regardless of the gender of departing members, female appointments are less likely than male appointments. More interestingly, female appointments are more likely when a female departs than when a male departs from the board. The probability of appointing a female when a female departs from the board, as predicted by the model, is 37%, which is very close to the probability in the raw data. Furthermore, while there are no formal quotas favoring women's appointments to central bank boards, we find that the percentage of females on the board has a negative impact on

the likelihood of appointing a female. This means that female presence on the board of a central bank acts as a barrier to the appointment of other females, except when they replace each other.

Our findings suggest that females face barriers to achieving equal representation on central bank boards. Furthermore, within our sample of 26 OECD countries, it seems that these barriers are not country specific, since central banks around the world operating under different legal, institutional and social environments exhibit a similar gender-biased pattern of appointments to the board.

It is important to note that central bank boards lag in terms of female representation despite the fact that the pattern of appointments of females to central banks is similar to the pattern revealed for corporate boards (Farrel and Hersch, 2005). This suggests that quotas may be useful for moving from an equilibrium with low female representation to a more equal equilibrium (Kogut et al, 2014).

Future work may explore the consequences of gender biases in the patterns of appointments. For instance, future work could determine whether the financial crisis was more severe in countries with more or less gender diversity on the central bank board. More broadly, analyzing the role of gender in the governance of central banks may provide new insights into the role of these institutions in the economy. Finally, from an empirical point of view, expanding our dataset to include non-OECD countries may also be a fruitful avenue of research.

6. Acknowledgements

The authors acknowledge funding from CERESSEC. This project is part of the Labex MME-DII (ANR 11-LBX-0023-01). We also thank participants at the AFFI 2015 and the FEBS 2016 conferences.

References

Adams, R. B. and D. Ferreira (2009). Women in the boardroom and their impact on governance and performance. *Journal of financial economics 94*(2), 291–309.

Adams, R. B. and T. Kirchmaier (2015). Barriers to boardrooms.

Adams, R. B. and V. Ragunathan (2015). Lehman Sisters. *FIRN Research Paper*.

Ahern, K. and A. K. Dittmar (2012). The changing of the boards: The impact on firm valuation of mandated female board representation. *The Quarterly Journal of Economics 127*(1), 137–197.

Carter, D. A., B. J. Simkins, and W. G. Simpson (2003). Corporate governance, board diversity, and firm value. *Financial Review 38*(1), 33–53.

Corbett, G. G. (2011). Sex-based and non-sex-based gender systems. *The World Atlas of language structures online 31*.

Dryer, M. S. and M. Haspelmath (2011). The world atlas of language structures online. munich: Max planck digital library. *Online: h ttp://wals. info*.

Erhart, S., H. Lehment, and J. L. V. Paz (2010). Monetary policy committee size and inflation volatility. *International Economics and Economic Policy 7*(4), 411–421.

Farrell, K. A. and P. L. Hersch (2005). Additions to corporate boards: the effect of gender. *Journal of Corporate finance 11*(1), 85–106.

Farvaque, E., H. Hammadou, and P. Stanek (2011). Selecting your inflation targeters: Background and performance of monetary policy committee members. *German Economic Review 12*(2), 223–238.

Gay, V., D. L. Hicks, and E. Santacreu-Vasut (2016). Migration as a window into the coevolution between language and behavior. *Available at SSRN 2747153*.

Koetter, M., K. Roszbach, G. Spagnolo, et al. (2014). Financial stability and central bank governance. *International Journal of Central Banking 10*(4), 31–68.

Kogut, B., J. Colomer, and M. Belinky (2014). Structural equality at the top of the corporation: Mandated quotas for women directors. *Strategic Management Journal 35*(6), 891–902.

La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. Vishny (1999). The quality of government. *Journal of Law, Economics, and Organization 15*(1), 222–279.

Laeven, L. and F. Valencia (2013). Systemic banking crises database. *IMF Economic Review 61*(2), 225–270.

Maoz, Z. and E. A. Henderson (2013). The world religion dataset, 1945–2010: Logic, estimates, and trends. *International Interactions 39*(3), 265–291.

Masciandaro, D., P. Profeta, and D. Romelli (2015). Gender and monetary policymaking: Trends and drivers. *BAFFI CAREFIN Centre Research Paper* (2015-12).

Open-Letter (2012). The ecb would benefit from less gender discrimination. *voxeu.org*.

Romelli, D. (2016). The political economy of reforms in central bank design: evidence from a new dataset. Mimeo, Department of Economics, ESSEC Business School.

Santacreu-Vasut, E., O. Shenkar, and A. Shoham (2014). Linguistic gender marking and its international business ramifications. *Journal of International Business Studies 45*(9), 1170–1178.

Tett, G. (2013). Central banking: still a mans world. *Financial Times*.

Tsang, A. (2013). Women of the worlds central banks'. *Financial Times*.

World Bank (2014). World development indicators 2014. Technical report, World Bank Publications.

Table A1: Sample of Countries

Country	Board Name	Avg Board	Avg Female
Australia	Reserve Bank Board	9.00	1.50
Austria	Governing Board	4.00	0.00
Canada	Board of Directors	14.69	3.00
Chile	Central Bank Board	5.00	0.27
Czech Republic	CNB Bank Board	7.00	0.75
Denmark	Board of Governors	3.00	0.00
Estonia	Executive Board	3.53	0.00
Finland	Governing Board	3.67	0.61
France	Monetary Policy	9.38	2.13
Germany	Governing Board	6.79	0.36
Hungary	Monetary Council	9.47	1.93
Ireland	Central Bank Commission	10.85	1.23
Italy	Governing Board	4.50	0.33
Japan	Policy Board	9.00	1.00
Luxembourg	Governing Board	9.00	0.76
Mexico	Governing Board	4.94	0.00
Netherlands	Governing Board	4.69	0.62
New Zealand	Board of Directors	1.00	0.00
Poland	Monetary Policy	10.00	1.67
Portugal	Board of Directors	5.94	0.22
Slovakia	Bank Board of the NBS	6.89	1.00
Spain	The Governing Council	10.00	1.92
Sweden	Executive Board	6.00	2.08
Switzerland	Governing Board	3.00	0.06
United Kingdom	Monetary Policy Committee	9.00	1.38
United States of America	Board of Governors of the FED	6.78	2.00

PARIS

ESSEC Business School
3, avenue Bernard-Hirsch
CS 50105 Cergy
95021 Cergy-Pontoise Cedex
France
Tél. +33 (0)1 34 43 30 00
www.essec.edu

ESSEC Executive Education
CNIT BP 230
92053 Paris-La Défense
France
Tél. +33 (0)1 46 92 49 00
www.executive-education.essec.fr

ESSEC Asia-Pacific
5 Nepal Park
Singapore 139408
Tél. +65 6884 9780
www.essec.edu/asia

SINGAPOUR

Contact :

Centre de Recherche
+33 (0)1 34 43 30 91
research.center@essec.fr

ISSN 1291-9616