

Gender and lawmaking in times of quotas<sup>☆</sup>Quentin Lippmann<sup>\*</sup>

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## ABSTRACT

This article studies gender differences in lawmaking in a context of gender quotas. I use two empirical strategies to randomize the gender of legislators and text analysis to identify the topics of the legislation in the French Parliament from 2001 to 2017. Across the two Houses, I find consistent evidence that female legislators work on different topics than men. I show that they are most active on women's issues while men seem more involved in military issues. I provide evidence that these differences partly stem from legislators' individual interest. From a public policy perspective, the results suggest that gender quotas are likely to lead to a shift in lawmaking and a greater prevalence of women's issues in Parliament.

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## 1. Introduction

In 2020, only 26% of parliamentary seats worldwide were held by women.<sup>1</sup> This imbalance is often criticized on the grounds that politicians tend to advocate on behalf of groups that share a component of their identity. According to this argument, female legislators would defend the interests of women more than their male counterparts, and increasing the number of women in politics would lead to a legislation that is more favorable to women's rights and interests. In the wake of the introduction of gender quotas in about 130 countries, this argument has become increasingly relevant.<sup>2</sup>

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<sup>1</sup> <https://data.worldbank.org/indicator/SG.GEN.PARL.ZS>.

<sup>2</sup> <https://www.idea.int/data-tools/data/gender-quotas/country-overview>.

Yet, despite important policy implications, the validity of this argument remains debatable. There is conflicting evidence on this question. In developing countries, studies have shown that female politicians deliver different types of policies (Chattopadhyay and Duflo, 2004; Clots-Figueras, 2011, 2012; Bhalotra and Clots-Figueras, 2014 or Brollo and Troiano, 2016), while results have been less conclusive in developed countries (Ferreira and Gyourko, 2014; Bagues and Campa, 2021) questioning whether gender matters only in specific contexts. On top of this debate, the existing studies have mostly exploited spending or public goods data which may be difficult to relate to women's issues and compare across different settings, perhaps explaining some of the inconsistent findings of the literature. There is limited evidence on lawmaking, even though it is one of the main activities of politicians.

In this paper, I study gender differences in lawmaking in a context of gender quotas. I focus on the French Parliament, an interesting setting as it is located in a developed country, where gender differences in policymaking are questionable, and representative of the changes brought by gender quotas. In 1997, less than 8% of Parliament seats were occupied by women. Following the introduction of gender quotas in both Houses in 2001, the share of female legislators gradually rose to about 25% in 2017. To identify the effect of the legislator's gender, I use two empirical strategies for the two Houses of the Parliament. To measure lawmaking

outcomes, I collected data on all the 300,000 amendments defended by legislators during the 2001–2017 period and use both unsupervised and dictionary-based methods to classify the topics within this legislation (Section 3).

The first part of this paper focuses on the Lower House (Section 4). To identify the effect of the legislator's gender, in the preferred specification, I use a regression discontinuity approach exploiting mixed-gender close races. I first apply unsupervised topic modeling on the entire set of amendments in order to test whether female legislators produce amendments on different topics than men *overall*. I find strong support in favour of this hypothesis. Then, I use dictionary-based methods to classify the legislation into 27 topics that are easier to interpret and study gender differences on each of these topics. I show that women's issues are the ones with the largest differences in involvement between male and female legislators. As for other topics, female legislators are more active on child and health issues where they are respectively about 50% and 25% more likely to initiate at least one amendment. At the other extreme, men appear to be about 50% more likely to initiate at least one amendment on military issues. There is only weak or no evidence of gender differences on topics traditionally considered as more feminine such as education or more masculine such as business.

Next, I focus on the Upper House (Section 5). Starting in 2001, a gender quota was introduced in districts that elect more than 4 senators. To identify the effect of the quota, I use a difference-in-differences strategy comparing the activity of districts targeted by the quota to those that are not, before and after the introduction of the quota. Consistently with the results obtained in the Lower House, I find that the activity of districts targeted by the quota became significantly different than the one of other districts after the introduction of the quota. Second, using dictionary-based methods, I show that districts targeted by the quota increased the most their activity on women's issues. At the other extreme, I find suggestive evidence that they also decreased their activity on military issues, although the results are less precisely estimated. As regards other topics, the quota seemed to have little if no impact.

To demonstrate the robustness of the results to multiple testing issues, I implement bootstrap-based permutation tests that consist in randomizing the treatment and the content of dictionaries (Section 6). I show that the results are unlikely to be obtained under random circumstances, suggesting that multiple testing issues are not driving the findings. Moreover, I also show that the results are robust to using different types of outcomes.

The last part of the paper explores the mechanisms behind these findings (Section 7). I first show that women seem to be as active as men, which suggests that the results are not driven by differences in the overall level of activity of legislators. Second, I study whether gender differences in lawmaking could be driven by other characteristics of legislators that are correlated with gender. To do so, I replicate the empirical strategies and control for other individual characteristics of legislators such as their age, political experience and past occupations. The results remain essentially similar indicating that these characteristics are unlikely to drive the findings.

Finally, I focus on the mechanisms explaining the consistent effect of female legislators on women's issues. The two empirical strategies allow to neutralize the role of constituents' preferences and the results suggest that female legislators produce more legislation on this topic because of their identity. But what lies behind identity? It could be that female legislators are intrinsically more interested in women's issues but it could also be that political parties strategically force female legislators to produce women-related amendments. To provide evidence on the individual interest channel, I restrict the sample to cases where amendments are

unlikely to stem from the will of political parties. It can be observed that, as we move to cases where the political party influence declines, female legislators are increasingly more likely to author women-related amendments than men. I also provide evidence that women are more likely to initiate consequential amendments. This suggests that the greater contribution of female legislators to women's issues partly stems from their individual interest. To consolidate this interpretation, I exploit an institutional feature of the 2012–2017 term where the Lower House legislators were granted discretionary funds and show that, relatively to men, female legislators had a greater propensity to use these funds for gender equality projects.

These results contribute to several strands of the literature. The first strand relates to the role of women as policymakers. While an early literature in political science found that gender matters for lawmaking (Thomas, 1991; Thomas and Welch, 1991 or Bratton and Haynie, 1999), the results remain difficult to interpret as they do not disentangle constituents' preferences from politicians' identity. Starting from Chattopadhyay and Duflo (2004), the economic literature has attempted to identify the role of politicians' gender. Studies focusing on developing countries have generally found that gender matters for policymaking (Clots-Figueras, 2011; Clots-Figueras, 2012; Bhalotra and Clots-Figueras, 2014 or Brollo and Troiano, 2016) while the results have been mixed in developed countries (Ferreira and Gyourko, 2014 or Gago and Carozzi, 2020).<sup>3</sup> Additionally, the existing studies have exploited spending or public goods data which are difficult to compare across different settings and may not include categories of interest such as women's issues. To my knowledge, this paper is the first to combine the use of text analysis and quasi-experimental variations to investigate the effect of legislators' gender. This approach (i) provides evidence that female legislators work on different topics and defend women's issues more than men in a developed country setting (ii) allows to compare their activity on a wide range of topics while previous studies often study only one topic or pool them in large categories and (iii) provides direct evidence on the individual action of female politicians while existing papers focus on the aggregate effect.

The second strand, closely linked to the first, relates to the effects of gender quotas in politics. This literature has attempted to understand their effect on policymaking (Chattopadhyay and Duflo, 2004; Bhalotra et al., 2020; Bagues and Campa, 2021), the perception of women (Beaman et al., 2009), the quality (Baltrunaite et al., 2014; Besley et al., 2017) and future careers of politicians (O'Brien and Rickne, 2016; Lippmann, 2018; Lassébie, 2019; O'Connell, 2020) and the influence of other policies (Baltrunaite et al., 2019) or electoral systems (Gonzalez-Eiras and Sanz, 2021) on the presence of women in politics. This paper is related to the part of this literature focusing on policymaking for which the existing evidence in developed countries remains limited. I contribute to this literature by analyzing the role of lawmakers at the national level and by studying two different quota designs in France. The results suggest that women elected in the context of gender quotas have different lawmaking activities and defend women's issues more than men.

The third strand relates to the wider debate on the impact of politicians' identity. In the classical median voter model (Downs, 1957), politicians' identity does not matter as policies should converge towards the preferences of the median voter. But in later-developed frameworks enriching the Downsian model (Alesina, 1988; Osborne and Slivinski, 1996 or Besley and Coate, 1997), policymakers' identity can play a role and influence which policies are implemented. The findings of this paper bring empirical support to

<sup>3</sup> See Wangnerud (2009), Lawless (2015) or Hessami and da Fonseca (2020) for reviews of the literature on the substantive effects of women representation in politics.

these political economy models. Moreover, the methods used in this paper could be extended to understand the influence of alternative dimensions of identity. Examples of these dimensions include among others caste (Pande, 2003), ethnicity (Broockman, 2013; Burgess et al., 2015; Kramon and Posner, 2016; Luca et al., 2018), family (Washington, 2008), geographic origin (Hodler and Raschky, 2014; Do et al., 2017) and religion (Meyersson, 2014; Bhalotra et al., 2014 or Chaudhary and Rubin, 2016).

## 2. Institutional context: legislative work in the French parliament

### 2.1. Public policy impact: bills, amendments and vote

Legislators have three ways to directly impact public policy: draft bills, amendments and vote.

**Bills** - Bills can be introduced by the government or by parliamentarians. Since the government sets the agenda of the Houses for two weeks per month (and has various means to set the agenda during the remaining two weeks), the introduction of a bill by parliamentarians does not necessarily lead to its examination. Moreover, when introduced by parliamentarians, bills often result from a collective initiative originating from the political party to which parliamentarians belong.

**Amendments** - Amendments consist of the deletion, modification or addition of articles included in an existing bill. Amendments can be both sole-authored or co-sponsored by other parliamentarians. Importantly, there is no limit on the number of amendments to a bill that can be submitted, nor is there a limit on the number of co-sponsors an amendment can have or the number of amendments a parliamentarian can produce. Unlike draft bills, all amendments must be examined and discussed.

**Votes** - To be adopted, amendments and bills need to obtain a majority of votes. In the vast majority of the cases, the voting system is done with a show of hands. This is the regular procedure and has been adopted because it is much faster than alternative methods. For important bills, the vote can be recorded. In this case, parliamentarians vote from their seat with an electronic device. In the event of an absence, it is possible to delegate votes to another representative.

### 2.2. Amendments as the main form of parliamentary initiative

In the French Parliament, there is no doubt that amendments are the main form of parliamentary initiative.<sup>4</sup> Quantitatively, it is well-established that the government remains the primary source of bills ultimately adopted while amendments mainly originate from parliamentarians. In the past 50 years, more than 70% of bills originated from the government while, during the period 2002–2017, more than 80% of amendments were initiated by parliamentarians (see Tables A1 and A2).

As for votes, there is a strong party discipline in the French Parliament which leaves little room for individual initiative, since parliamentarians risk being excluded from their party if they vote against bills from their own side. Therefore, unless the bill is hotly debated (as the abortion bill studied in Van Effenterre (2020)), nearly all legislators follow this party discipline. As illustration, over the 2012–2017 Lower House term, about 60% of bills had no rebel vote and more than 90% had less than 10 (see Figure A1).

<sup>4</sup> As illustration, the Lower House website states that “The right to amend is today the main form of expression of the parliamentary initiative” (<http://www2.assemblee-nationale.fr/decouvrir-l-assemblee/role-et-pouvoirs-de-l-assemblee-nationale/les-fonctions-de-l-assemblee-nationale/les-fonctions-legislatives/l-exercice-du-droit-d-amendement-et-annexe>).

Qualitatively, scholars have acknowledged amendments as the main form of parliamentary initiative (Knapp and Wright, 2006; Avril and Gicquel, 2014). They often argue that this situation stems from the possibility for the government to set a large part of the agenda of both Houses (Rasch and Tsebelis, 2013). As such, bills are not necessarily discussed whereas all amendments must be examined.

## 3. Data

### 3.1. Sources

**Lawmaking activity.** For the Lower House, the data on the activity of legislators is accessible on the official website starting from 2002.<sup>5</sup> I web scraped this data to build an analyzable data set containing all the amendments discussed during the 2002–2007, 2007–2012 and 2012–2017 terms. For the Upper House, the data on the amendments from 2001 onwards can be downloaded from the official website.<sup>6</sup> Unfortunately, the data is not available before 2001.

For every amendment, this data set indicates: its content, a short text outlining why it is important and should be adopted, and the bill that the amendment attempts to modify. The content is usually very short and standardized while the short texts are written directly by the legislators and contain arguments specific to the amendments.<sup>7</sup> The data set also specifies the identity of the amendment's initiator and of all the legislators who co-sponsored it.<sup>8</sup>

**Election Results.** The data on the official election results come from the 2002, 2007 and 2012 elections for the Lower House and the 1995, 1998, 2001, 2004, 2008, 2011 and 2014 elections for the Upper House.<sup>9</sup>

### 3.2. Identifying the topics of amendments

#### 3.2.1. Unsupervised methods

The topics of the amendments are not explicitly stated and there does not exist a training data set containing pre-defined categories. Absent these information, to retrieve the topics of the amendments and construct the outcomes of interest, I use two complementary approaches that rely on unsupervised and dictionary-based methods.

The unsupervised approach is used to answer the following question: “as compared to male legislators, are female legislators working on different topics overall?”. To compute the distribution of topics over each document, I rely on the Latent Dirichlet allocation (LDA) topic modeling technique (Blei et al., 2003). This method models each document as a finite mixture over an underlying set of topics and has been used in recent papers in economics (see for instance Hansen et al., 2018).

I apply this method to the entire set of amendments discussed in the French Parliament over the period 2001–2017. I focus on the text justifying why amendments should pass. Before applying the LDA model, I pre-process each document in the following manner. First, I remove all the common stop words that are frequently used such as “the” or “and”. Second, I reduce each term to its linguistic

<sup>5</sup> <http://www2.assemblee-nationale.fr/recherche/amendements>.

<sup>6</sup> <http://data.senat.fr/donnees/>.

<sup>7</sup> Contents often only state a set of words should be added or removed. They use standardized formulations that can be found on the Lower House website (in French) at <http://www2.assemblee-nationale.fr/decouvrir-l-assemblee/role-et-pouvoirs-de-l-assemblee-nationale/les-fonctions-de-l-assemblee-nationale/les-fonctions-legislatives/l-exercice-du-droit-d-amendement-et-annexe>.

<sup>8</sup> See Fig. B1 for an example of amendment on the Lower House website.

<sup>9</sup> <https://www.data.gouv.fr/en/posts/les-donnees-des-elections/>.

root through stemming so that words such as “economics” or “economical” become “econom”. In the preferred model, I estimate the distribution of documents over 30 topics.<sup>10</sup> Table B1 displays the top-5 keywords associated to 30 topics and Fig. B2 computes correlations between the topics found with the LDA approach and the dictionary-based methods.

The main advantages of this unsupervised method over the dictionary-based approach discussed in the next section is that the user does not need to specify words associated to topics. For each document, the method delivers the prevalence of each topic. Therefore, it allows to abstract from one’s subjectivity and decompose documents into a finite number of topics in order to study gender differences over this set of variables.

The main drawbacks of unsupervised methods are that the topics (i) can be difficult to interpret and (ii) may not be the ones we are interested in. For these two reasons, unsupervised methods seem mainly useful to ask whether women produce amendments on different topics than men *overall*. If we wish to study specific topics, then dictionary-based methods described in the next section appear more appropriate.

### 3.2.2. Dictionary-based approach

To study gender differences in lawmaking over specific topics, I first define a list of 27 non-mutually exclusive topics corresponding to the permanent government ministries that existed over the period 2001–2017 in France. To assign each amendment to a topic, I classify the most frequent 10,000 words into each of the 27 categories and remove false matches. This section illustrates this method by focusing on the topic of women’s issues.<sup>11</sup>

To identify the topics of amendments, I use dictionary-based methods containing words related to the topic of interest. For the topic related to women’s issues, I classify an amendment as women-related if the bill’s title or the text outlining the arguments why the amendment should pass contain one of the words included in the dictionary. I exploit these two sources of information as legislators can disseminate and provide provisions related to women’s issues in bills that specifically target these issues but also in other bills that initially focus on a different topic. In the latter case, the short text will be informative on the motivation of the amendments.

To build the dictionaries, the assumption is that if the topic of an amendment is related to women, the term “women” or a synonym will appear. The dictionary contains the words “wom”, “gender” and “sex”.<sup>12</sup> The rationale behind this definition is that amendments may refer to women’s issues without explicitly using the word “women”. For instance, they may only contain the expression “gender equality” or “equality between the sexes”. Therefore, introducing the words “gender” and “sex” provides a more complete dictionary of women’s issues. To reduce potential measurement errors from such a definition, I removed false matches associated with the keywords “gender” and “sex”. These false matches refer to the use of the word gender as a synonym for “genre” or “kind of” in French and to the use of sex to refer to the same-sex marriage bill passed in the 2012–2017 term (see Table B4 for the list).<sup>13</sup>

The dictionary selected 3,905 amendments as women-related in the Lower House corresponding to a prevalence of 1.82% (2,064 amendments in the Upper House for 1.88%). The word “wom” is much more frequent than “sex” or “gender”. In the Lower

House, “wom” occurs 5,554 times while “sex” and “gender” respectively occur 815 and 560 times. Additionally, Fig. B5 provides descriptive statistics on the topics that are associated to women’s issues. We observe that 35% of women-related amendments also mention labor issues and about 25% mention family or health issues while slightly less than 20% also discuss child issues.

### 3.2.3. Validity of the dictionary

To provide evidence on the validity of the dictionary, I perform two types of checks: one before the results and one after. Absent a training data set, the pre-checks consist in studying the most frequent expressions and manually screening the sample of amendments. The post-checks consist in testing the robustness of the findings to placebo samples. This section displays the pre-checks related to the topic of women’s issues, the post-checks are described in Section 6.

**Most Frequent Expressions** – Table 1 displays the 5 most frequent bigrams and trigrams used in the sample of women-related amendments.<sup>14</sup> Looking at Panel A, the most frequent trigram is “equality wom men” which appears 292 times in the sample of amendments and the most frequent bigram is “wom men” which appears 1092 times. Most of the expressions are directly related to women’s issues containing the word “women” associated with “equality”, “professional” or “violence”. It strongly suggests that these amendments are used to improve gender equality. The only exception concerns part-time work which is associated with women’s issues, because legislators tend to regulate the use of part-time work for women since they are significantly more likely to be in this position than men. Additionally, the expression “fight against” is among the most frequent bigrams as it is often used before an expression related to gender inequality.

**Manual Screening.** For the main topic related to women’s issues, I also manually screened all the 3,905 amendments in order to determine the share of amendments falsely classified. I found that 86% of amendments are unambiguously women-related. This rate is high and comparable to other studies using dictionary-based approaches (for instance Baker et al., 2016). The wrongly classified amendments often refer to jobs mainly occupied by women (such as prostitution). A small share (about 5%) also includes false matches that are difficult to identify.<sup>15</sup> For instance, some amendments refer to citizens as “men and women” in a general statement. Additionally, I also found that nearly 99.3% of these amendments are in favor of measures striving to achieve gender equality. This could be because it is politically difficult to defend a policy that is against more policy effort on women’s issues.

## 4. Evidence from the Lower House

### 4.1. Empirical setting

#### 4.1.1. Election system and gender quotas for the Lower House

**Electoral System** – The elections for the Lower House (legislative elections) occur every 5 years in France and aim at electing 577 representatives (*Députés* in French) in 577 constituencies.<sup>16</sup> Parliamentarians are elected by direct universal suffrage.

The election system follows a two-round plurality voting rule system. To be elected in the first round, an individual must obtain

<sup>14</sup> Table B5 displays the ranking of trigrams/bigrams depending on their odds ratio.

<sup>15</sup> Additionally, I also attempted to quantify the share of false negatives. I manually screened a random sample of 1,000 amendments. I found that about 4% of them could be related to women’s issues. Additionally, nearly 6% were related to family or child issues which are sometimes considered as more closely related to women’s issues (See for instance Gago and Carozzi, 2020).

<sup>16</sup> In 2012, a redistricting took place to reflect France’s changing demographics. 33 constituencies were replaced by new ones leading the number of unique constituencies in the sample to be higher than 577.

<sup>10</sup> In the appendix, I also display the results related to other numbers of topics.

<sup>11</sup> For other topics, additional methodological details are provided in Section B.3 and descriptive statistics on the prevalence of each topic are displayed in Fig. B3.

<sup>12</sup> In French, these keywords are respectively “femme”, “genre” and “sexe”. These keywords are stemmed such that the word “women” becomes “wom” to capture the singular and plural forms but also words such as womanly.

<sup>13</sup> This procedure is similar to the topic analysis in Gentzkow et al. (2019).



**Table 1**  
Most Frequent Trigrams and Bigrams in the Sample of Amendments Related to Women's Issues.

(1)	(2)	(3)	(4)	(5)	(6)
	Trigrams			Bigrams	
Rank	N	Keywords	N	Keywords	
1	292	equalit wom men	1092	wom men	
2	142	violenc done wom	664	part time	
3	125	worker part time	573	men wom	
4	100	professional wom men	341	fight against	
5	97	access wom men	293	equalit wom	

Notes: the data come from all the amendments produced in the French Lower House over the period 2002–2017. It is restricted to amendments identified as related to women's issues with a dictionary-based method. These amendments contain at least one of the following words: "wom", "sex" or "gender". The word "wom" is the stem of words such as women or woman.

more than 50% of the votes and 25% of the registered citizens. If these conditions are not met, a second round is organized a week later and the two first-ranked candidates are automatically qualified for it. Additional candidates qualify only if their first-round vote share was higher than 12.5% of the registered citizens. To be elected in the second round, a relative majority is sufficient and the candidate who receives the highest vote share is the winner.

**Gender Quotas** - Starting in 2002, financial incentives were introduced to force political parties to nominate women. If a political party does not nominate 50% of women, its public funding will be reduced proportionally to the gender gap in nomination. Between the 2002 and 2012 elections, the share of female legislators increased from less than 10% to 27% (see [Lippmann, 2021](#) for an evaluation of this policy).

#### 4.1.2. Methods

To identify the effect of the legislator's gender, I mainly use two complementary specifications in order to obtain both a comprehensive view of what happens in the Lower House and to disentangle the interests of legislators from those of constituents. The results must be seen in the context of a quota although these specifications do not directly exploit the design of the Lower House quota. Since new female candidates as well as female incumbents may have been endorsed because of the quota, it is not possible to identify women who were elected because of the quota. The first empirical specification is the following:

$$Y_{ict} = \beta \text{Woman}_{ict} + \gamma X_{ict} + \epsilon_{ict} \quad (1)$$

where  $i$  is the subscript for the individual level,  $c$  for the constituency level and  $t$  for the term. Since there is only one legislator per district, the observation level is at the legislator-term level.  $Y_{ict}$  is the outcome variable. When using unsupervised methods, the outcome is the share of amendments produced on a given topic as with these methods, more than 95% of legislators are found to be associated with all topics. When using dictionary-based methods, the outcome is a dummy equal to 1 if the legislator has initiated at least one amendment on the topic of interest. In this case, I focus on the extensive margin since for some topics, such as women's issues, about 60% of legislators have never initiated an amendment.  $\text{Woman}_{ict}$  is the main variable of interest. It is a dummy that equals 1 if the legislator is a woman.  $X_{ict}$  includes other control variables, namely the age at the beginning of the term, the political inclination (left or right-wing)<sup>17</sup>, the incumbency status, the margin of victory at the election, the female labor force participation rate in the constituency and term fixed-effects.

<sup>17</sup> Since about 91% of the legislators are either from the main left-wing (*Parti Socialiste*) or right-wing (*Union pour un Mouvement Populaire - UMP*), I control by a left vs right dummy that allows me to incorporate minor parties instead of political parties fixed-effects. The allocation of parties to the left vs right-wing is described in Section C.2.

While this specification is useful to obtain a comprehensive view of gender specialization in the Lower House, it does not disentangle what stems from constituents' demands from the parliamentarians' interests. Since women could be expected to be elected in more gender-friendly places which also demand more gender equality, estimates of  $\beta$  from Eq. 1 could capture both the effect of the legislator's gender and the effect of constituents' preferences, unobservable in the data.

To disentangle these two effects, in the preferred specification, I use a regression discontinuity design exploiting mixed-gender close races.<sup>18</sup> During these elections, women run against men and there are cases where a candidate of either sex wins by a narrow margin. In such cases, victory can be considered as random since unpredictable random events affect the electoral outcomes ([Lee, 2008](#)) and therefore provide exogenous variations for the sex of legislators. Empirically, the running variable is the vote margin between the first woman and the first man during the last round of the election.<sup>19</sup> Providing that confounders behave continuously around the victory threshold and that candidates cannot manipulate their score, this strategy causally identifies the impact of female legislators. Formally, the third empirical specification is:

$$Y_{ct} = \alpha + \beta \mathbb{1}\{X_{ct} > 0\} + \gamma f(X_{ct}) + \epsilon_{ct} \quad (2)$$

where  $c$  is the subscript for the constituency level and  $t$  for the election term.  $X_{ct}$  is the running variable.  $\mathbb{1}\{X_{ct} > 0\}$  is a dummy that equals 1 if the running variable is positive, i.e. if a woman won the seat.  $f(X_{ct})$  is a polynomial interacted with  $\mathbb{1}\{X_{ct} > 0\}$ . This equation is estimated on a narrow margin around the elimination threshold weighting observations with a rectangular kernel. The reference bandwidth is selected following the approach of [Calónico et al. \(2014\)](#) depending on the vote margin.<sup>20</sup>

Table C1 provides descriptive statistics on the characteristics and activity of Lower House legislators. The sample includes all the legislators who were elected and effectively served as

<sup>18</sup> As a robustness check, I also add fixed-effects at the constituency level to control for unobservable time-invariant characteristics. Yet, factors simultaneously determining the election of a woman and the policy decisions taken by the legislator, such as constituents' attitudes towards women's issues, could vary over time at the level of the constituency and undermine the causal interpretation of the fixed-effect estimates.

<sup>19</sup> This method is regularly used in the literature investigating the impact of female politicians (see [Ferreira and Gyourko, 2014](#); [Bhalotra and Clots-Figueras, 2014](#); [Brollo and Troiano, 2016](#) or [Bhalotra et al., 2017](#)). If the woman wins, the running variable is positive and if the man wins, this variable is negative. For example, if the first woman obtains 55% of the votes and the first man 45%. Then, the running variable would be equal to 10 percentage points. In Section C.7, I replicate the analysis on a sub-sample of races where the first man and woman are also the first two ranked candidates.

<sup>20</sup> To probe the robustness of the results, I also fit a second order polynomial in the running variable on the entire sample and use the IK bandwidth ([Imbens and Kalyanaraman, 2012](#)). The bandwidths were selected with the Stata packages *rdrobust* and *rdob*.

a legislator.<sup>21</sup> The sample contains 1,663 legislators over the 2002–2017 period. About 19% of the legislators are women. They are about 55 years old. They co-sponsor about 1,038 amendments and initiate 124 per term, out of which women's issues represent 2% on average.

#### 4.1.3. Internal validity tests

The validity of the regression discontinuity design hinges on two assumptions: absence of manipulation of the vote margin and continuity of potential confounders at the cutoff.<sup>22</sup> Fig. 1 provides evidence on the absence of manipulation in the running variable around the elimination threshold. Visually, we observe that male candidates win more often against female candidates but, importantly for the identification strategy, there is no evidence of a discontinuity in the density of the vote margin. The statistical tests (McCrary, 2008; Cattaneo et al., 2018) do not reject the null hypothesis of no manipulation. This could be expected as manipulation would require either electoral fraud, which is extremely rare in France, or the prediction of election results with extreme accuracy, which is unlikely because there are usually no polls in these constituencies.

To test the continuity assumption of potential confounders, I estimate Eq. 2 using a set of covariates as outcome variables. If the setting is valid, there should not be any discontinuity in these covariates. Four sets of covariates are considered: one representing election characteristics (number of candidates, number of registered voters, abstention rate and invalid vote rate, political inclination of the constituency), one representing demographic characteristics (total population size, total male population, total female population, share of women in the population, share of working women, share of working age people, unemployment rate), one representing preferences for women (female vote share in T and T-1) and one representing the lagged main outcome (initiation of an amendment on women's issues in T-1). As shown in Table 2, the continuity assumption seems verified as there is no significant jump at the cutoff for each of these covariates (the relevant graphs are in Figures C2, C3, C4 and C5). Therefore, there is no evidence that the results are driven by any other characteristic than the gender of the legislator elected.

## 4.2. Results

### 4.2.1. Are female legislators working on different topics overall?

The analysis starts with a study of aggregate gender differences in lawmaking. The goal is to answer whether female legislators are working on different topics overall, without studying each topic separately. To that end, I use a Latent Dirichlet Allocation (LDA) model in order to decompose the entire set of amendments in a fixed number  $K$  of topics (see Section 3.2.1) and construct  $K$  outcomes  $Y_{kct}$  corresponding to the share of amendments produced on a topic  $k$  at time  $t$  by a legislator in constituency  $c$ .

I then estimate a system of  $K$  equations with identical explanatory variables and  $K$  different outcomes. I test for the joint significance of the coefficient related to the variable that equals one if the legislator is a woman over the entire range of equations. Formally, using the preferred specification of Eq. 2 as an illustration,

I estimate a system of seemingly unrelated equations, clustering standard errors at the district level, of the form  $Y_{kct} = \alpha_k + \beta_k \mathbb{1}\{\mathbb{X}_{ct} > 0\} + \gamma_k \mathbb{f}(\mathbb{X}_{ct}) + \epsilon_{kct}$  for  $k = 1, \dots, K$  where  $K$  denotes the total number of topics. The explanatory variables remain the same for each equation but there are now  $K$  explained variables corresponding to the  $K$  topics found by the LDA. Then, I use a Wald test to determine whether the coefficients associated to  $\mathbb{1}\{\mathbb{X}_{ct} > 0\}$  are jointly significant, i.e. whether  $\beta_1 = \dots = \beta_K = 0$ . If the test leads to the rejection of the null hypothesis, it would mean that the evidence suggests that female legislators work on different topics than men, overall.

Using  $K = 30$  topics, I obtain a test statistic  $\chi^2 = 58.3$ . As this is strictly greater than the 1% level critical value of 50.89 corresponding to a  $\chi^2$  distribution with 30 degrees of freedom, the conclusion of the Wald test is the rejection of the null hypothesis. This suggests that, as compared to male legislators, women are involved in different lawmaking activities overall. To demonstrate the robustness of this result, in Section C.3, I show that the findings are robust to using different total number  $K$  of topics for  $K = 30, 40, 50, 60$  and 70 topics and two different specifications that rely on Eqs. 1 or 2.

### 4.2.2. Gender differences in lawmaking by topic

The purpose of this section is to study on which topic gender differences in lawmaking emerge. To that end, I use dictionary-based methods and classify the most frequent 10,000 words within the entire set of amendments into 27 categories (see Section 3.2.2) in order to construct 27 outcomes corresponding to the topics of interest.

Fig. 2 displays the relative contribution of female legislators to each topic. Each row corresponds to a topic and each dot to the scaled probability that a woman will initiate at least one amendment on the given topic as compared to a man. The results are displayed for the least (Pooled OLS, graph a) and the most restrictive specifications (RDD with the CCT bandwidth, graph b).

First, looking at the first row of both graphs, we see that women's issues constitute the key topic on which gender differences in terms of contribution are the most striking. Women are about twice as likely to initiate an amendment on women's issues and there is no other topic where differences are as large.

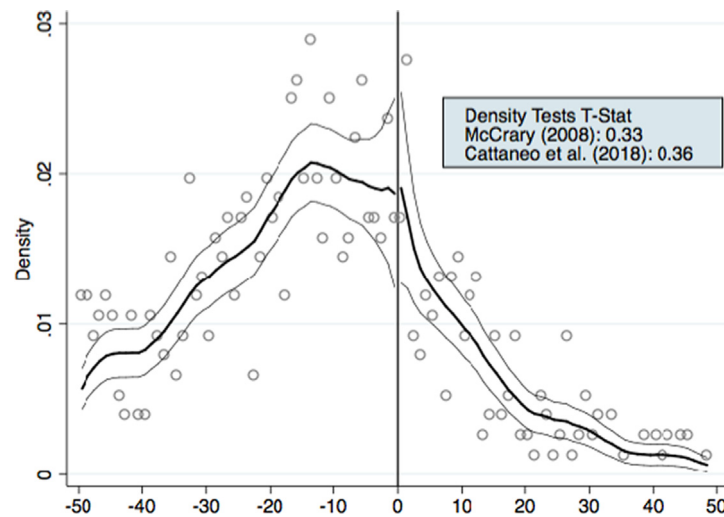
Second, besides women's issues, two topics seem to emerge as significantly more associated with female legislators: child and health issues, which are displayed in the second and fourth rows. Female legislators are respectively about 50% and 25% more likely to initiate at least one amendment related to child and health issues in the RDD specification. Coefficients are nonetheless more precisely estimated when it comes to child issues (both significant at the 5% level) than health issues (5% and 10% in the RDD specification).<sup>23</sup> The association of female legislators with health issues seems consistent with recent findings in the literature obtained in India (Bhalotra and Clots-Figueras, 2014). The other topics where women seem slightly more involved than men are migration and family issues. In terms of point estimates, these topics come respectively in 3rd and 5th position. Yet, the estimations are imprecise and the coefficients are not significant at standard significance levels ( $p$ -values of 0.187 and 0.221 in the RDD specification).

At the other end of the spectrum, we see that women seem to be respectively about 50% less likely to initiate at least one amendment related to military issues ( $p$ -values = 0.047). There is also suggestive evidence that female legislators are less involved in

<sup>21</sup> After each election, about 20 legislators out of 577 are nominated at high-ranked positions and never occupy the position of legislator in Parliament.

<sup>22</sup> One drawback of the RDD specification is its external validity. I provide evidence on this question in Figure C6 and show that the close races are scattered throughout the territory. Additionally, in Figure C7, I show that the preferences for female politicians, measured with the female vote share, ranges from 20 to about 70%, which is comparable to other studies exploiting mixed-gender close races (for instance Bhalotra et al., 2017 in India).

<sup>23</sup> When using a fixed-effects specification, the results are very similar to the pooled OLS specification. They are displayed in Figure C11.



**Fig. 1.** Manipulation Test. Notes: the data come from the 2002, 2007 and 2012 election results for the Lower House. The x-axis represents the vote margin between the first woman and the first man in a mixed-gender election. On the right-hand side of the vertical dashed line, a woman is elected and on the left-hand side, a man.

**Table 2**  
Testing the Continuity Assumption.

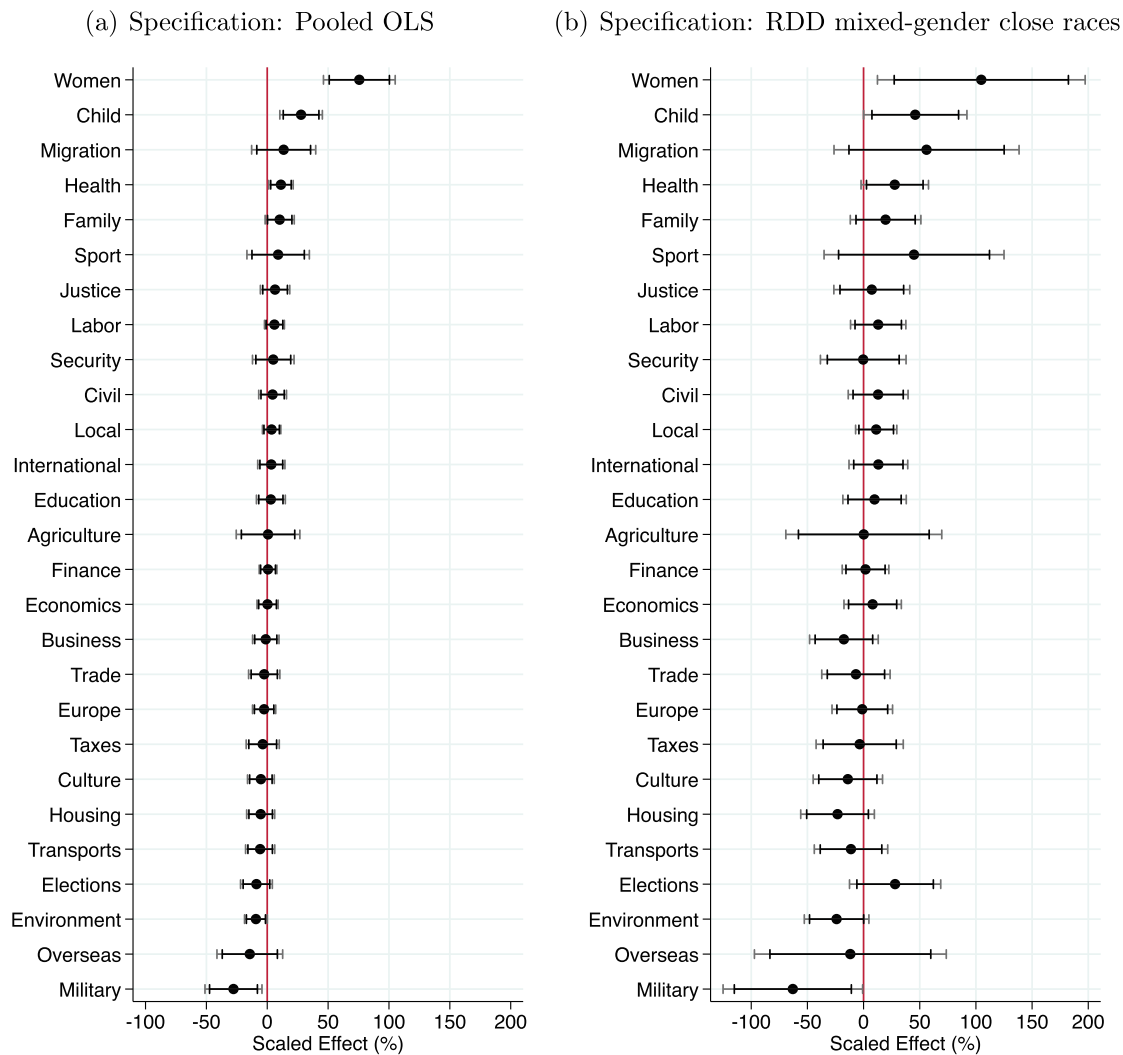
	(1) Discontinuity Estimate	(2) Control Mean	(3) Bandwidth Restriction	(4) N Observations
N Registered Voters	−368.056 (3421.465)	76387.4	13.04	315
Abstention Rate	−.545 (1.181)	39.3	11.91	287
Invalid Vote Rate	−.145 (.13)	2	16.18	388
Total Population	−935.812 (4430.921)	112301.5	19.59	441
Population Male	−731.9 (2224.377)	54414.4	18.9	435
Population Female	−170.523 (2238.119)	57924.7	19.17	439
Share Women Population (0–100)	.252 (.182)	51.5	13.01	311
Share Working Women (0–100)	−.819 (1.306)	63.5	20.83	470
Share Working Age Population (0–100)	.41 (.737)	64.4	14.05	335
Unemployment Rate (0–100)	.351 (.608)	9.1	13.75	330
Female Vote Share (0–100)	.554 (1.339)	46.3	8.74	213
Female Vote Share T-1 (0–100)	−3.581 (7.793)	27	9.63	233
Left Wing Constituency	−.037 (.115)	.4	9.86	237
Women-Related Amendment T-1	−0.017 (.09)	.15	16.6	297

Notes:  $p < 0.1$ ,  $**p < 0.05$ ,  $***p < 0.01$ . The data come from the French Lower House over the period 2002–2017. Standard errors clustered at the constituency level are given in parentheses. Each line corresponds to one dependent variable. Column 1 displays the discontinuity estimates, column 2 shows the mean of these outcomes when a man is elected within the bandwidth restrictions, column 3 displays the bandwidth restrictions and column 4 the number of observations. The model fits a local linear regression around the cutoff that allows for a break in the slope at the cutoff. The bandwidth is computed following the CCT approach.

environmental issues although the estimations are less precise and the coefficient is not significant at standard significance levels ( $p$ -values = 0.102).

For the rest of the topics, where the estimates are less precise, it is interesting to look at the magnitude of the scaled effect which informs us on the general ranking of issues. Education

issues, often associated with female legislators (see respectively Thomas, 1991; Clots-Figueras, 2012), come in 13th position for women (in the Pooled OLS specification). Conversely, agriculture and fiscal issues, sometimes associated with men (Schwindt-Bayer, 2005) come in 14th and 15th position, and exhibit very few differences.



**Fig. 2.** Gender Differences in Lawmaking in the Lower House. *Notes:* the data come from the Lower House over the period 2002–2017. Each row corresponds to a topic. The outcome is a dummy that equals 1 if the legislator initiates at least one amendment on the topic considered. Each dot represents the coefficient associated to the variable *Woman* divided by the average of male legislators (scaled effect). Confidence intervals are represented at the 95% and 90% levels. Graphs (a) and (b) respectively represent estimates from the pooled OLS specification and the RDD mixed-gender close race with the CCT bandwidth.

## 5. Comparison with the Upper House

### 5.1. Empirical setting

#### 5.1.1. Election system and gender quota for the Upper House

**Electoral System** - Elections to the Upper House (Senate) aim at electing 348 representatives in 103 constituencies. Senators are elected by indirect universal suffrage where only locally elected politicians can vote.

Elections are staggered and a third of the Senate is renewed every 3 years, constituting three series depending on the election years (thereafter series 1, 2 and 3).<sup>24</sup> Each series contains two types of constituencies, depending on the number of senators that have to be elected (which depends on the population size). In the first type of constituencies (thereafter type 1) where strictly more than 3 candidates are elected (52% of constituencies), the election system is one of proportional representation and follows a closed list system where votes are counted at the level of a list. Seats are attributed following a proportional rule where each candidate has a pre-

determined election rank on a list and when the number of votes for a list increases, so does the number of elected candidates. In the second type of constituencies (thereafter type 2) where strictly less than 4 candidates are elected (48% of constituencies), the election system follows a two-round plurality voting system. It is similar to the election system of the Lower House except that for some constituencies 2 or 3 representatives are elected.

**Gender Quotas** - In 2000, a law was voted requiring constituencies where the election system was proportional representation, i.e. constituencies of type 1 which elect strictly more than 3 candidates, to comply with a gender quota. For each list, there had to be a strict alternation between men and women. If the first on a list was a man, the second had to be a woman and the third a man, and so on. For constituencies of type 2 which elect strictly fewer than 4 candidates, this law made no difference.

Each series had to comply with the quota during the first elections after the vote of the law. Therefore, series 1 which had elections in 2001 had to comply in 2001, series 2 which had elections in 2004 had to comply in 2004 and series 3 which had elections in 2008 had to comply in 2008. For each series, only the constituencies of type 1 which elect more than 3 candidates had to comply with the quota.

<sup>24</sup> Figure D1 schematizes the election schedule and its evolution through time.



### 5.1.2. Methods: difference-in-differences

To identify the effect of the legislator's gender, I exploit directly the design of the Upper House quota introduced in elections after 2000.<sup>25</sup> Since the data is available only from 2001 onwards, I focus on the two series for which I have information before and after their compliance with the quotas. It corresponds to series 2 and 3, renewed in 2004 and 2008. In each of these two series, there are two types of districts: districts of type 1 that have to comply with the quota because they elect strictly more than 3 candidates and districts of type 2 that do not have to comply with the quota because they elect strictly less than 4 candidates.

I use a difference-in-differences strategy where the treatment group consists in districts of type 1 and the control group consists in districts of type 2. The treatment date corresponds to the first election where a series has to comply with the quota (i.e. 2004 for series 2 and 2008 for series 3). The outcome is the share of amendments authored by a district on a topic. Formally, I pool the two series and estimate the following specification:

$$Y_{ct} = \alpha_0 + \alpha_1 \text{Treatment}_c + \alpha_2 \text{Post}_t + \delta \text{Treatment}_c * \text{Post}_t + \epsilon_{ct} \quad (3)$$

where  $c$  is the subscript for the constituency level and  $t$  for time.  $\text{Treatment}_c$  is a dummy that equals 1 if a constituency has to comply with the quota, i.e. elects strictly more than 3 senators.<sup>26</sup>  $\text{Post}_t$  is a dummy that equals 1 if the election year is after the compliance with the quota (2004 for series 2 and 2008 for series 3).  $\delta$  is the key coefficient representing the impact of the quota. I use two sets of outcomes. First, to measure the effectiveness of the quota,  $Y_{ct}$  corresponds to the number of female senators in a given district. Second, to study the lawmaking impact of the quota,  $Y_{ct}$  designates the share of amendments produced on a given topic for both unsupervised and dictionary-based methods, given that the unit of analysis is a multi-member constituency.

Over the period 2001–2017, Upper House parliamentarians produced 109,497 amendments. Table D1 provides descriptive statistics at the district level. On average, 3 senators are elected per district. They are older than Lower House legislators (59 vs 54 years old) and about 12% are women. Each district produces about 566 amendments per term on average, out of which 1% are women-related.

The causal interpretation of the difference-in-differences estimates relies on the common trend assumption. In this context, it assumes that the difference in terms of lawmaking activity between districts targeted by the quota and those that are not would have remained the same, absent the introduction of the quota. To probe evidence in favor of this assumption, it would be ideal to show that the lawmaking activity of the two types of districts followed the same trend before the introduction of quotas. Yet, given that the lawmaking data only start one period before the introduction of quotas, I cannot directly test this assumption using this type of outcome. Instead, as a second-best, I use data on the number of female legislators per district (available on a longer time frame) to show that the gender composition of districts evolved similarly in the two types of districts before the introduc-

tion of quotas. This suggests that the mechanism which is supposed to drive the results, i.e. the number of female legislators per district, was following a common trend before the introduction of quotas.<sup>27</sup>

## 5.2. Results

### 5.2.1. Impact of the quota on the election of women

In order to assess the effectiveness of the quota, I begin by analyzing its impact on the number of female legislators per district. Fig. 3 displays the evolution of the number of female legislators per constituency in the two types of districts (targeted and untargeted by the quota) for each election. Given that the elections are staggered, the results are presented by pooling elections depending on their date with respect to the introduction of gender quotas.<sup>28</sup> Before the introduction of the quota, we observe that the number of female legislators per constituency was respectively about 0.5 and 0 in districts targeted by the quota and those that are not. Additionally, the difference between the two types of districts seemed to remain stable over time.<sup>29</sup> Following the introduction of the quota, this number rose to about 2 in districts that had to comply with the new law while it increased mildly to less than 0.5 in the other type of district.

Table 3 quantifies the jump in the number of female legislators due to the introduction of the quota. The pre and post-period are pooled in order to obtain an aggregate measure of the increase of women due to the quota that can be used to put in perspective the impact on the lawmaking activity found in the next section. The three columns use different specifications pooling the period after the introduction of the quota, according to the presence of time and constituency fixed-effects. Overall, it appears that the quota has increased the number of female senators elected per constituency by 1.13. In column 1, looking at the coefficient related to  $\text{Treatment} * \text{Post}$ , the coefficient is equal to 1.13 and significant at the 1% level. When constituency and time fixed-effects are added, in columns 2 and 3, this increase remains stable.<sup>30</sup> Therefore, the following results should be interpreted in the context of a quota electing 1.13 additional woman per district with a counterfactual of 0.24.

### 5.2.2. Impact of gender quotas on lawmaking

*Unsupervised Methods* – I now turn to the analysis of authorship of amendments. As for the Lower House, I start by asking whether districts targeted by the quota changed their lawmaking activities and started working on different topics overall. To answer this question, I use the  $K$  topics found by the LDA model to construct  $K$  outcomes of interest corresponding to the share of amendments a district produces on a given topic. Then, I replicate the empirical strategy outlined in Section 4.2.1. It consists in estimating a system of  $K$  equations (relying on the specification of Eq. 3 and clustering standard errors at the district level) using  $K$  different outcomes and testing the joint significance of the coefficient related to the difference-in-differences estimates ( $\text{Treatment}_c * \text{Post}_t$ ).

Using  $K = 30$  topics, I obtain the test statistic  $\chi^2 = 76.03$ . Therefore, the conclusion of the Wald test is to reject the null hypothesis

<sup>25</sup> One could think of using a RD design in a proportional system as in Folke (2014) to randomize the election of a woman by comparing districts where a woman was narrowly elected on a list to those where she narrowly lost. However, two issues emerge which are (i) a problem of statistical power as only 30% of districts (out of 72) use a proportional system (and elect about 50% of senators) and (ii) this would boil down to using the variation in the share of women elected from the quota as, over the 2001–2017 period, nearly 70% of female senators were elected after the introduction of quotas in districts targeted by the quota. For these two reasons, it appears more appropriate to exploit directly the setting of the quota.

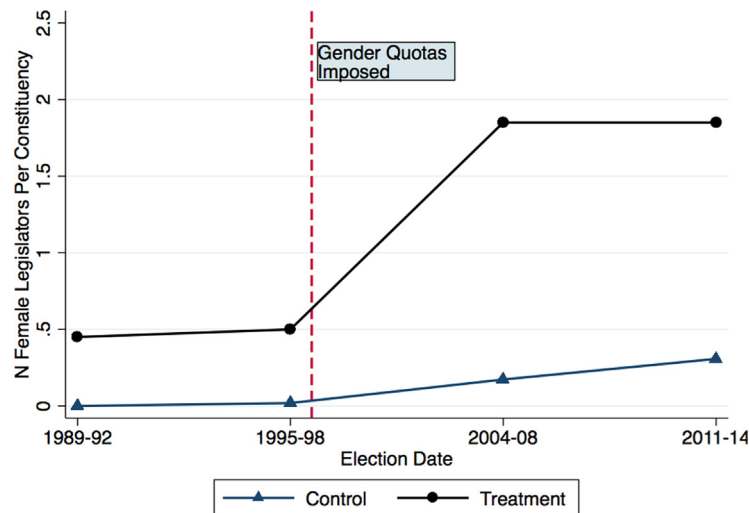
<sup>26</sup> This binary treatment seems more appropriate than a continuous treatment that would consist in the distance between the share of women before the introduction of quotas in a district at the party level and the threshold of 50% of women because nearly 75% of districts targeted by the quota did not have a single woman elected before their introduction.

<sup>27</sup> Additionally, in Figures D4 and D5, I use data from the 1990, 1999, 2005 and 2012 French censuses to show that the share of women in the population and the unemployment rate at the district level, which could have both influenced the legislation evolved in parallel in the two types of districts.

<sup>28</sup> For instance, the elections occurring in 1995 and 1998 are pooled together since they are the last elections before the introduction of gender quotas for each series.

<sup>29</sup> Figure D3 confirms this visual interpretation by testing whether the evolution of the difference is statistically significant.

<sup>30</sup> In the Appendix Table D3, alternative measures of the political representation of women are considered (share of women and at least one woman per constituency). The quota had an unambiguous positive impact on all these measures.



**Fig. 3.** Impact of the Gender Quota on the Number of Female Legislators in the Upper House. *Notes:* the data come from the election results of the French Upper House over the period 1989–2014. The y-axis represents the average number of female legislators elected per constituency. The x-axis represents the election dates. Circles and triangles respectively designate the average number of female legislators per constituency for those that have to comply with the quota and those that do not need to. The vertical red-dashed line corresponds to the date where gender quotas were introduced.

**Table 3**  
Impact of Gender Quotas on the Number of Female Legislators - Upper House.

	Dep. Var.: N Female Legislators Per Constituency		
	(1)	(2)	(3)
Treatment*Post	1.13*** (0.25)	1.13*** (0.30)	1.13*** (0.30)
Control Mean	0.24	0.24	0.24
F-Statistic	37.3	17.8	12.1
Time Fixed-Effects	No	No	Yes
Constituency Fixed-Effects	No	Yes	Yes
Observations	216	216	216
Constituencies	72	72	72

*Notes:* \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . The data come from the French Upper House over the period 2001–2017. Standard errors clustered at the constituency level are given in parentheses. The dependent variable is the number of female legislators per constituency. *Treatment* designates districts that had to comply with a gender quota. The “Control Mean” line designates the average number of female senators per district in those that do not have to comply with the quota.

that the coefficients are not jointly significant ( $p$ -values  $< 0.01$ ). This suggests that districts targeted by the quota are working on different topics overall. Moreover, in Table D4, we observe that the results are robust to using different numbers of topics for  $K = 30, 40, 50, 60$  and  $70$ .<sup>31</sup>

**Dictionary-Based Methods** - Fig. 4 displays the results related to the impact of the quota on each of the 27 topics computed with the dictionary-based methods. To ease comparisons between the two Houses, graph (a) corresponds to the RDD results in the Lower House and graph (b) to the difference-in-differences results obtained in the Upper House.

First, consistently with the Lower House, I find that the key topic with the strongest gender differences is women's issues. The quota led to a 200% increase in the share of amendments produced on this topic when the effect is scaled to the activity of districts that did not comply with the quota.<sup>32</sup> As for military issues, which were found to be negatively associated with women in the Lower House, the coefficient is negative suggesting that districts impacted

by the quota could have decreased their share of amendments produced on this topic. Yet, the fact that the coefficient is not significant at standard significance levels ( $p$ -values = 0.114) does not allow to conclude definitively on the direction of the effect. Finally, as in the Lower House, the quota had little if no impact on a vast range of topics such as business, agriculture, economics or to a lower extent educational issues.

Second, we observe some suggestive evidence of inconsistent findings between the two Houses. In particular, secondary topics on which women seemed to be more active in the Lower House such as child and to a lower extent health issues do not seem to be impacted by the quota. For these topics, the point estimates are negative. Yet, given the large standard errors, the estimations remain imprecise and do not allow to conclude statistically on a different effect between the two Houses.

## 6. Additional robustness

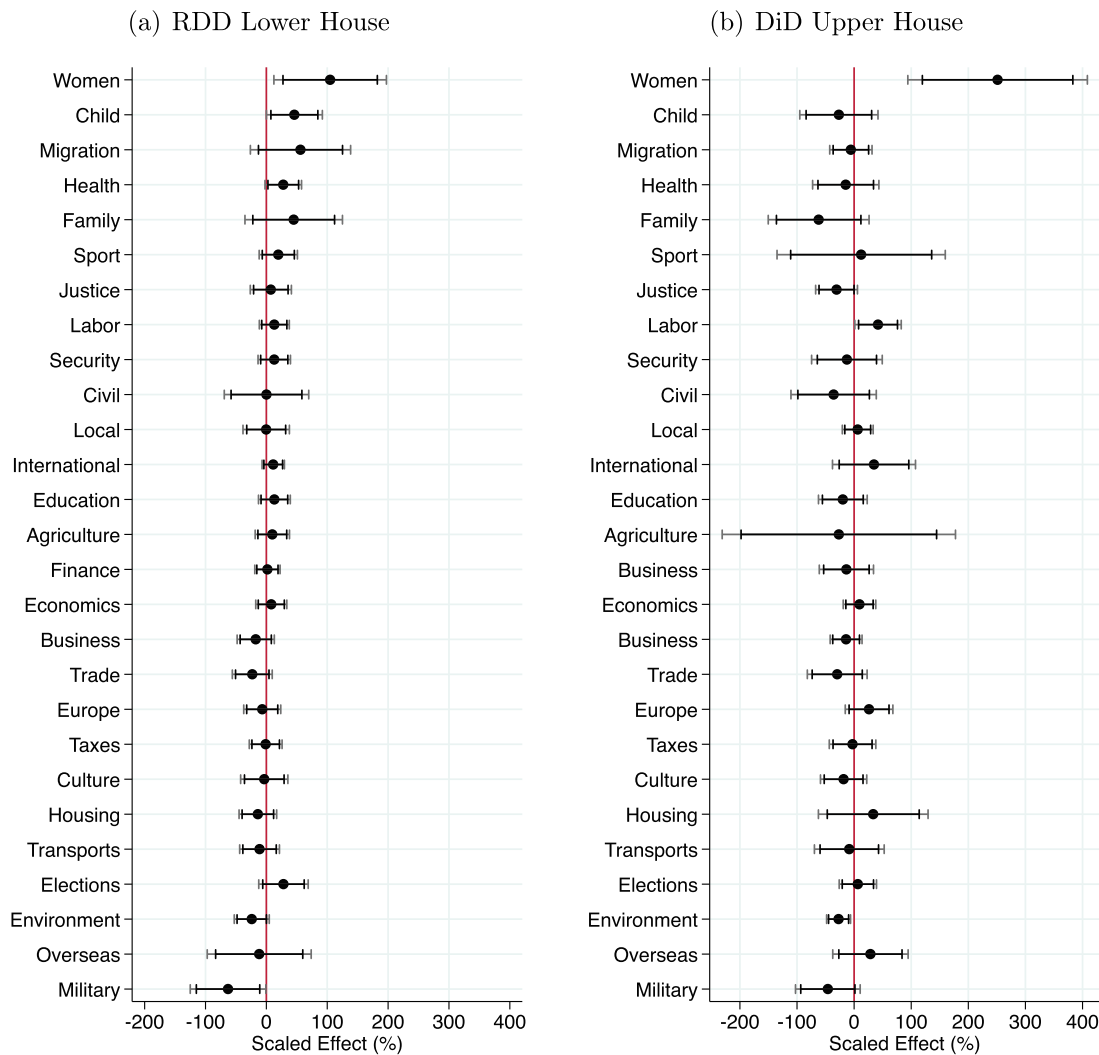
### 6.1. Multiple testing issues

It could be questioned whether the results are driven by multiple testing issues, whereby the probability of false positives increases as the number of outcome variables increases. To adjust the  $p$ -values to the number of hypotheses tested, one could think of using corrections in the spirit of the Bonferroni one. The issue with this type of correction is that it can become too stringent when the tests are not independent (Perneger, 1998; Cribbie, 2007; Harvey et al., 2016). For instance, in the extreme case where all the tests are the same (correlation = 1), adjusting the  $p$ -values become irrelevant. In the context of testing gender differences in lawmaking, there are strong reasons to believe that tests are not independent as legislators may be interested in closely related topics, and an increased activity on a topic can be done at the expense of a lowered activity on a different topic.

In the presence of correlations, the statistics literature has argued for the use of bootstrap-based permutation tests (Westfall and Young, 1993; Ge et al., 2003). They consist in exchanging labels randomly within the data a large number of times in order to build an empirical distribution for the pool of test statistics against which the one obtained with the real sample is compared to. Their main advantage is that they take into account the correlation

<sup>31</sup> In Figure D6, I also display the impact of the quota on each of the 30 topics.

<sup>32</sup> Formally, the scaled effect corresponds to the coefficient  $\delta$  of Eq. 3 divided by the average share of amendments produced on a topic by districts that did not have to comply with the quota.



**Fig. 4.** Gender Differences in Lawmaking Across the Two Houses. *Notes:* each row corresponds to a topic. Confidence intervals are represented at the 95% and 90% levels. In graph (a), the data come from the Lower House over the period 2002–2017. The outcome is a dummy that equals 1 if the legislator initiates at least one amendment on the topic considered. Each dot represents the coefficient associated to the regression discontinuity estimates (variable *Woman*) divided by the average of male legislators (scaled effect). In graph (b), the data come from the Upper House over the period 2001–2017. The outcome is the share of amendments produced by a district on the topic considered. Each dot represents the coefficient associated to the difference-in-differences estimates (variable *Treatment \* Post*) divided by the mean of the outcome in districts not targeted by the quota (scaled effect).

structure in the data without any distributional assumption. For this reason, they are considered as the “gold standard” to adjust for multiple testing issues when tests are not independent (Conneely and Boehnke, 2007; Han et al., 2009).<sup>33</sup>

I perform two types of tests. The first type consists in permuting the amendments to build counterfactual outcomes. For each of the 27 topics in the two Houses, I randomly drew with replacement 1,000 samples of amendments of equal size to the sample used in the main regression. Then, I replicated the analysis in order to obtain 1,000 T-statistics and compared these statistics with the ones obtained with the main dictionaries. The second type of test consists in permuting the treatment (gender in the Lower House and type of district in the Upper House) while keeping its proportion within the population stable. As in the first type of test, this exercise is performed 1,000 times to obtain the related T-statistics. The results are displayed in Figures E1 and E2. In a nutshell, they show that it is unlikely to reproduce the results by

chance. For instance, for women’s issues, less than 0.3% of the random samples provide t-statistics larger than the one obtained on the sample used for the analysis in the Lower House. It therefore suggests that the results are not driven by wrongly classified amendments, nor by multiple testing issues.

## 6.2. Alternative outcomes and dictionaries

*Dummy, count and share variables* - The main outcomes used in the analysis relying on dictionary-based methods were respectively a dummy variable that equals 1 if the legislator had initiated an amendment on a given topic in the Lower House and the share of amendments on a topic in the Upper House. In this section, I replicate the results on the topic of women’s issues using four different outcomes: the raw count, a dummy, the share, and an inverse hyperbolic sine transformation of the count of amendments on a given topic. The results are displayed in Tables E1 and E2 for respectively the Lower House and the Upper House. Overall, we observe that the results are robust to using these different outcomes, although the precision of the estimates may vary.

<sup>33</sup> They are particularly used in genetic association studies which regularly face multiple testing issues (see Ge et al., 2003).

Additionally, I also study the distributional effect of female legislators on women's issues in Figure E3 and show that women are significantly more likely to be among the top initiators on the topic of women's issues.

*Unlabeled Amendments* - The dictionary-based methods attributed a topic to about 90% of all amendments. One could wonder whether there exists gender differences in the initiation of the remaining 10% - thereafter unlabeled amendments - which may contain relevant amendments. To study this question, I estimate the impact of electing a female legislator (Lower House) and gender quotas (Upper House) on the initiation of unlabeled amendments. The results are displayed in Tables E3 and E4. Overall, we do not observe any significant gender differences in the initiation of these unlabeled amendments. I also re-estimated the main specifications by controlling for the share of unlabeled amendments produced by a legislator/district. The results remain essentially unchanged (See Tables E5 and E6).

*Removing False Positives and Mentions of Specific People* - Finally, for the dictionary of women's issues, I also studied how the results vary when removing amendments falsely categorized within a category and those that may be categorized within this category because they mention specific women. The results are displayed in Table E7 and E8. They are essentially similar to those including these two types of amendments.

## 7. Mechanisms

### 7.1. Are women more active overall?

The previous results indicate that there exists gender differences in lawmaking, where female legislators seem to initiate more women-related amendments. A potential reason explaining this result could be that female legislators are more active and produce more amendments overall. If this was true, it would imply that gender differences in lawmaking would not be the consequences of gender differences in priorities but rather gender differences in the overall level of activity. This mechanism could exert a stronger influence in the Lower House where the outcome was a dummy variable corresponding to the extensive margin of amendments' initiation (when using the dictionary-based methods).

To provide evidence on this mechanism, I study gender differences in the level of activity. The results are displayed in Table 4 (the relevant graphs are in Figure F1). In Panel A, the outcome is a dummy that equals 1 if the legislator has initiated at least one amendment and, in Panel B, the outcome is the number of amendments initiated. Each column corresponds to a different specification.

In Panel A, we observe limited gender differences in amendments' initiation. First, the coefficients are not statistically significant in five specifications out of six. Additionally, the magnitudes of the effects remain close to zero. In the main RDD specification using the CCT bandwidth (column 5), the magnitude of the coefficient suggests that women could be about 5 p.p. more likely to initiate at least one amendment which represents a 6% increase, as compared to the average probability of men to initiate at least one amendment (about 85%).

In Panel B, the pattern is more nuanced as the coefficients are less precisely estimated. Although the coefficients are not statistically significant, the point estimates range from -29.55 (fixed-effects specification) to 13.18 (RDD with half the CCT bandwidth) and are equal to -9.45 in the preferred RDD specification using the CCT bandwidth.

Overall, while the estimates do not suggest that there are gender differences in overall activity, their lack of precision does not allow to completely rule out this mechanism. Therefore, I replicate

the main results in on the restricted sample of legislators that initiate at least one amendment. The results are displayed in Figure F2 and remain essentially similar suggesting that the potential gender differences in the overall level of activity are unlikely to explain the results.

### 7.2. Are gender differences in lawmaking driven by characteristics correlated with gender?

The gender of politicians is often correlated with other characteristics. For instance, in the Lower House, women elected in mixed-gender close races are younger than men but also more likely to be elected for the first time and to be affiliated with a left-wing party.<sup>34</sup> Could these differences in characteristics drive the results?

To investigate this channel, I replicate Fig. 4 adding controls related to the age, political orientation (left or right-wing), incumbency status and past occupation (12 categories).<sup>35</sup> The results are displayed in Fig. 5. We observe that the estimates are essentially similar when controls are added and that some results are more precisely estimated, especially the impact of the quota on military issues in the Upper House ( $p$ -values = 0.066 with controls and 0.114 without controls).

To push further the analysis of the influence of these characteristics, I also studied the heterogeneity of the results related to women's issues over three characteristics: political inclination, age and incumbency. The results are displayed in Table F2. Overall, I find weak evidence of an heterogeneous response. The estimations suggest that incumbent women could contribute more to this topic than inexperienced ones, yet the coefficient remains imprecisely estimated and significant only at the 10% level.

Arguably, these findings do not rule out the possibility that unobservable characteristics differ across the two sets of legislators. Yet, the fact that the estimates are almost identical when adding these control variables suggests that the influence of other characteristics correlated with gender on lawmaking priorities seems limited.

### 7.3. The contribution of female legislators to women's issues

The analysis provides consistent evidence across the two Houses that female legislators contribute more to women's issues. This section attempts to understand why.

#### 7.3.1. What lies behind identity?

In a standard median voter model (Downs, 1957), politicians' policies should converge towards the preferences of the median voter. Therefore, if women are elected in constituencies which are more gender-equal and more demanding on women's issues, female legislators should produce more amendments on these topics. While this mechanism is certainly present when we look at all the legislators in Parliament, it is much less influential when the analysis is restricted to districts with exogenous variations in the identity of the legislator. Both empirical strategies in the two Houses delivered results linking legislators' gender to large differences in terms of involvement in women's issues. This suggests that constituents' preferences cannot fully explain the results and paves the way for identity-based lawmaking.

<sup>34</sup> See Table F1 for a balance test on a range of individual characteristics of politicians elected in mixed-gender close-races.

<sup>35</sup> In the Lower House, these controls are added at the individual level given that constituencies elect only one individual. In the Upper House, I compute the mean at the district level given that constituencies elect several senators.



**Table 4**  
Gender Differences in Overall Parliamentary Activity - Lower House.

Specification	(1) Pooled OLS	(2) Fixed Effects	(3)	(4) <i>Regression Discontinuity</i>		(5)	(6)
			Poly	LLR IK	LLR CCT	LLR CCT/2	
<i>Panel A - Dep. Var.: At Least One Amendment Authored Per Term (1 = Yes)</i>							
Woman (1 = Yes)	0.01 (0.02)	0.04 (0.04)	0.06* (0.04)	0.03 (0.06)	0.05 (0.07)		0.08 (0.09)
Bandwidth Restriction			None	16.8	12.3		6.2
Observations	1663	1663	857	432	319		173
Constituencies	598	598	486	295	238		150
<i>Panel B - Dep. Var.: N Amendments Authored Per Term</i>							
Woman (1 = Yes)	-22.37 (15.80)	-29.55 (23.87)	15.00 (26.82)	-17.25 (32.48)	-9.45 (41.78)		13.18 (53.56)
Bandwidth Restriction			None	22.8	12.2		6.1
Observations	1663	1663	857	525	316		172
Constituencies	598	598	486	346	236		149

Notes: \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . The data come from the French Lower House over the period 2002–2017. Standard errors clustered at the constituency level are given in parentheses. The dependent variable in Panel A is a dummy equals to 1 if the legislator authors at least one amendment and the number of amendments authored in Panel B. Controls in specifications of columns 1 and 2 include the age at the beginning of the term, the political inclination (left or right-wing), the incumbency status, the margin of victory at the election, the female participation rate to the labor market in the constituency and term fixed-effects. Controls in column 2 also include constituency fixed-effects. Controls in column 3 include a second order polynomial in the running variable. Specifications of columns 4, 5 and 6 fit a local linear regression around the cutoff that allows for a break in the slope at the cutoff using respectively the IK, the CCT and half the CCT bandwidth.

But what lies behind identity? Two mechanisms could be at play. On the one hand, female legislators could be intrinsically more interested in women's issues and eager to contribute to this topic.<sup>36</sup> On the other hand, political parties or groups of legislators may behave strategically and anticipate that women-related policies led by women appear to be more credible and are therefore more likely to pass.

To provide evidence on the individual interest channel, I focus on the Lower House as the unit of observation is at the individual level and the number of observations is far higher than in the Upper House. The idea is to study cases where legislators' amendments are unlikely to stem from the will of political parties. The first case consists of sole-authored amendments. By definition, the involvement of legislators in such amendments cannot be explained by a desire to add political weight and increase the success rate of an amendment since there is only one author and no co-sponsors. The second case exploits the outcome of amendments from majority legislators. Over the period 2002–2017, there were two main parties in Parliament (right- and left-wing) which have successively had a majority. In practical terms, a majority in Parliament means that the party can pass any bill and amendment. It also increases the likelihood that bills already reflect parties' interest and lessens the incentives to produce amendments. Therefore, rejected amendments from a majority legislator provide an interesting case in which we are more likely to observe the individual interest of legislators than in the case of regular amendments.<sup>37</sup>

I investigate gender differences in the samples of women-related amendments that are (i) sole-authored, (ii) from a majority legislator and rejected by the majority, and (iii) both sole-authored and from a majority legislator and rejected by the majority. Fig. 6 displays the results. The vertical axis represents the scaled effect and the horizontal axis the three cases described above plus the initial case without restriction on the origin or the outcome of the amendment. Looking at the Pooled OLS specifica-

tion, it can be observed that as we move to cases where the influence of the party is likely to decline, female legislators are increasingly likely to initiate women-related amendments. The scaled effect goes from 100% for all amendments to 300% for sole-authored amendments originating from majority legislators and ultimately rejected by the majority. Turning to the fixed-effects and the RDD specifications, we observe a similar pattern: point estimates increase but, because of the reduced sample sizes, the standard errors also increase and it is more difficult to conclude on the relative size of the effects. Nevertheless, the effects do not seem to decrease in the three specifications which suggests that the greater involvement of female legislators on women's issues cannot be entirely explained by political party influence and is likely to partly stem from the individual interest of legislators.

### 7.3.2. Are the amendments consequential?

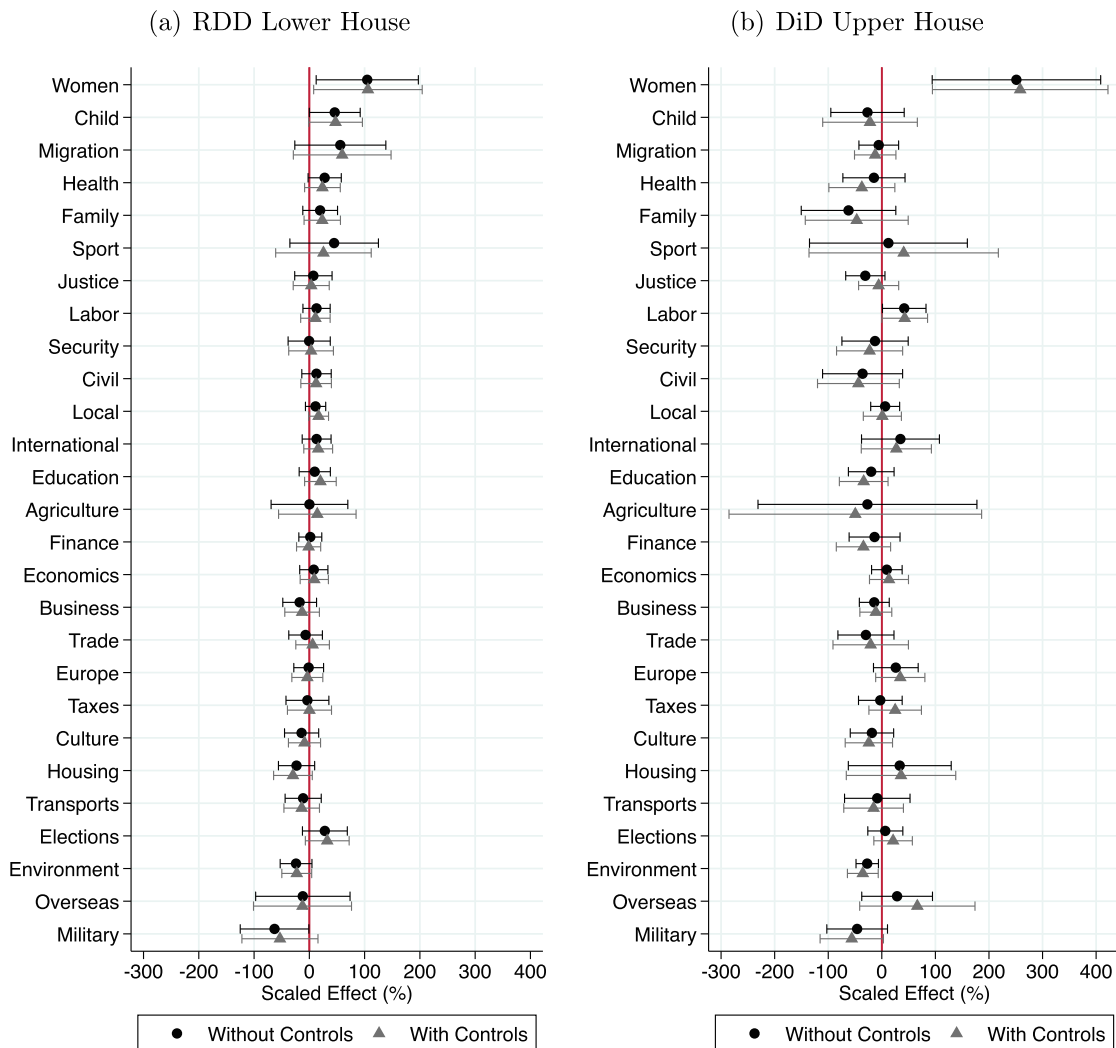
As the previous outcomes are related to the quantity of amendments, and not their importance, one could argue that women have been submitting a greater number of amendments on certain topics, without aiming at bringing significant changes to the law. To study whether female legislators produce more consequential amendments, I restrict the sample of women-related amendments to those that are likely to be more substantial using three different proxies for the importance of an amendment. The first proxy corresponds to amendments that are ultimately accepted and incorporated in the law. The second and third proxies are based on the motivation of the amendment. As explained in Section 3.2.2, legislators have the opportunity to defend and motivate why an amendment is important and should be adopted. I study amendments with (i) unique and (ii) without short motivations. The underlying idea being that a consequential amendment will likely have a substantial motivation.<sup>38</sup>

I study gender differences in initiation for each type of the above-mentioned amendments. The results are displayed in Fig. 7. The vertical axis represents the scaled effect and the horizontal axis the cases presented above. In a nutshell, we observe

<sup>36</sup> As I cannot directly observe preferences, the expression "individual interest" is used to designate the mechanisms acting at the individual level which encompass preferences but also self-selection, targeting a specific group of voters, or a feeling of fulfilling a duty.

<sup>37</sup> In Section F.3.1, I discuss in more details each type of amendment and provide descriptive statistics on their use.

<sup>38</sup> I discuss and explain in greater details the methodology and relevance of these restrictions in Section F.3.4.



**Fig. 5.** Are Gender Differences in Lawmaking Driven by Characteristics Correlated with Gender? *Notes:* each row corresponds to a topic. Confidence intervals are represented at the 95% level. In graph (a), the data come from the Lower House over the period 2002–2017. Each dot represents the coefficient associated to the regression discontinuity estimates (variable *Woman*) divided by the average of male legislators (scaled effect). In graph (b), the data come from the Upper House over the period 2001–2017. Each dot represents the coefficient associated to the difference-in-differences estimates (variable *Treatment \* Post*) divided by the mean of the outcome in districts not targeted by the quota (scaled effect). Controls include age, political orientation (left or right-wing), incumbency status and past occupation (12 categories).

that female legislators are significantly more likely than men to produce consequential amendments. The scaled effect related to the set of accepted amendments ranges from 200 to 350% in the preferred RDD specification. Additionally, we also observe that women are more likely to produce amendments that have a unique and long motivation. Finally, when superimposing the three restrictions, we see that women are again more likely to produce amendments accepted with substantial motivations. In that case, the average scaled effect ranges from about 200% in the pooled OLS specification to about 600% in the RDD specification. Therefore, the results suggest that gender differences persist and seem to increase (based on the point estimates) when amendments are more likely to be consequential, which suggests that the objective of female legislators is, at least partly, to produce significant changes in the law.

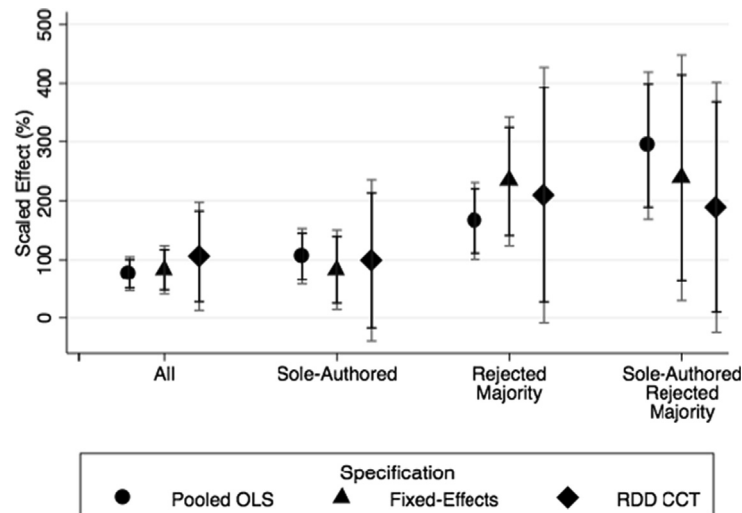
### 7.3.3. Additional evidence from legislators' discretionary funds

To complement the previous results, I also exploit an institutional feature of the 2012–2017 Lower House term. During this term, all legislators were granted a discretionary fund of 130,000

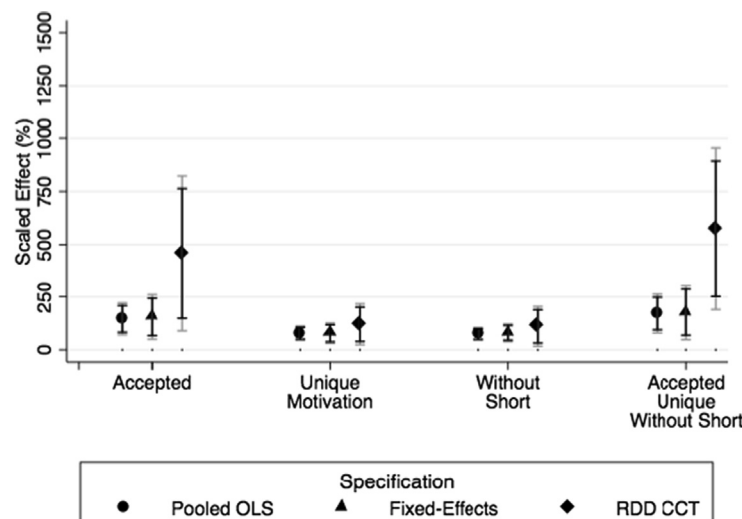
euros per year.<sup>39</sup> The use of these funds is interesting as it was entirely at the discretion of legislators who could attribute them to associations and local projects. Additionally, every expenditure had to be classified according to a pre-defined nomenclature which included one category entitled equality between men and women, likely to be the closest to women's issues. Therefore, an analysis of the destination of these funds is likely to portray the individual interests of legislators.

I exploit these data to build a dummy variable equal to 1 if the legislator has funded associations or projects related to women's issues. Using this outcome, I replicate the empirical strategy used in the Lower House setting. The results are displayed in Table 5 (the relevant graph is in Figure F5). We observe that, when a female legislator is elected by a narrow margin, the probability of her spending money on women's issues jumps by about 29–41 percentage points. Depending on the specification, this jump is sig-

<sup>39</sup> During the previous terms, these funds were only available to a small subset of legislators and there does not exist a data set on their use.



**Fig. 6.** Investigating the Individual Interest Channel. *Notes:* the data come from the French Lower House over the period 2002–2017. The y-axis represents the coefficient associated to the variable *Woman* divided by the average of male legislators (scaled effect) in a regression where the outcome is a dummy that equals 1 if the legislator initiates at least one women-related amendment. Confidence intervals are represented at the 95% and 90% levels. Sole-authored designates the sample of sole-authored amendments (without co-sponsors). Rejected majority designates the sample of amendments ultimately rejected whose author is from the majority. Sole-authored Rejected Majority designates the sample of sole-authored amendments ultimately rejected whose author is from the majority.



**Fig. 7.** Are the Amendments Consequential?. *Notes:* the data come from the French Lower House over the period 2002–2017. The y-axis represents the coefficient associated to the variable *Woman* divided by the average of male legislators (scaled effect) in a regression where the outcome is a dummy that equals 1 if the legislator initiates at least one women-related amendment. Confidence intervals are represented at the 95% and 90% levels. Accepted designates the sample of accepted amendments. Unique Motivation designates the sample of amendments that have a unique motivation. Without Short designates the sample of amendments without a short motivation.

nificant at the 1% or 10% level. It holds across the entire sample of legislators, controlling for individual and constituency characteristics (column 1) and in the four usual specifications used for the RDD (columns 2, 3, 4 and 5). Scaling this jump to the average for male legislators, it represents an increase in the probability of spending money on women's issues that ranges from 150 to more than 300%.<sup>40</sup> The scale of this effect is close to the one obtained in the previous section on rejected amendments by majority legisla-

tors. Therefore, this bolsters the interpretation in terms of individual interest.

## 8. Conclusion

This article has combined text analysis with quasi-experimental variations to investigate gender differences in lawmaking in a context of gender quotas. In the Lower House, using a regression discontinuity exploiting mixed-gender close races, I found evidence of overall gender differences in lawmaking. I showed that women's issues constitute the key topic on which female legislators are most active while men seemed more involved in military issues. In the Upper House, using a difference-in-differences strategy

<sup>40</sup> In Table F4, I quantify the surplus of fundings attributed to women's issues by using the raw amount as a dependent variable. Although the estimates are imprecise, they suggest that female legislators attribute about 10 to 15 additional thousands of euros to projects related to women's issues, as compared to their male counterparts.

**Table 5**  
Spending on Women's Issues - Lower House.

Specification	Dep. Var.: Legislator Has Funded Women's Issues (1 = Yes)				
	(1) Pooled OLS	Regression Discontinuity			
		(2) Poly	(3) LLR IK	(4) LLR CCT	(5) LLR CCT/2
Woman (1 = Yes)	0.29*** (0.05)	0.35*** (0.10)	0.41*** (0.14)	0.39*** (0.15)	0.39* (0.19)
Control Mean	0.18	0.16	0.12	0.13	0.13
Scaled Effect	154.8	215.6	328.7	299.4	297.4
Bandwidth Restriction		None	16.5	15.9	7.9
Observations	540	244	131	126	77
Constituencies	540	244	131	126	77

Notes: \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . The data come from the French Lower House over the period 2012–2017. Controls in specifications of column 1 include the age at the beginning of the term, the political inclination (left or right-wing), the incumbency status, the margin of victory at the election, the female participation rate to the labor market in the constituency. Controls in column 2 include a second order polynomial in the running variable. Specifications of columns 3, 4 and 5 fit a local linear regression around the cutoff that allows for a break in the slope at the cutoff using respectively the IK, the CCT and half the CCT bandwidth. The "Control Mean" line designates the outcome mean for the sample of male legislators. The "Scaled Effect" line designates the impact of female legislators scaled to the mean of male legislators (Treatment Effect/Control Mean).

exploiting the introduction of a quota, I found consistent evidence that the lawmaking activity of districts targeted by the quota is significantly different from the one of districts that were not. I showed that the quota led to an increased activity on women's issues. As for military issues, the quota seemed to have a negative impact on them but the estimations lacked the precision needed to conclude definitively on the direction of the effect. Studying the mechanisms, I provided evidence suggesting that the gender differences in lawmaking are not driven by the fact that women are more active than men, nor by other characteristics of legislators that are correlated with gender. Finally, I also gathered evidence consistent with the idea that the greater involvement of female legislators in women's issues is partly due to their greater individual interest for this topic.

Methodologically, the main contribution of this paper is to exploit text data from Parliament to identify the topics of the legislation, along with quasi-experimental variations to randomize the gender of legislators. Exploiting text data overcomes limitations stemming from data on spending or public goods, which may not include the topics of interest. Future research could extend this methodology to other countries, settings and dimensions of politicians' identity besides gender. It could also go one step further to study the direction of policy support on each topic by relying for instance on sentiment analysis methods or it could also use embedding models to measure the distance between a piece of text and a document of interest.

From a public policy perspective, these results have two consequences. First, they suggest that the gender of politicians can influence their action and lawmaking activities. This implies that the underrepresentation of women in politics is not innocuous in terms of policymaking and that correcting this imbalance through the introduction of gender quotas could lead to a shift in policymaking. Second, beyond gender, these findings question more generally the consequences of imbalances between the characteristics of politicians and those of the people they represent. More research is needed to understand whether these imbalances matter for policymaking and whether correcting them would lead to public policies that better encompass the interests of groups of people who are underrepresented in politics.

## Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.jpubeco.2022.104610>.

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