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The mechanical and psychological effects of legal thresholds☆

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ABSTRACT

In this paper, we estimate the effect of the legal threshold on the number of parties and decompose it into a mechanical and a psychological effect. We study the case of Morocco, whose local elections afford a rare opportunity to uncover the causal effect of the legal threshold, using a differences-in-differences approach. Our results show a large effect of the legal threshold on the number of parties. We find a large psychological effect in absolute terms: a 3% increase in the legal threshold leaves almost one effective party out of the council for purely strategic reasons. We conjecture that this large effect is due to the lack of institutionalization and programmaticness of most Moroccan parties.

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1. Introduction

Ever since Duverger (1954) formulated his famous propositions about the effect of electoral systems on the shape of party systems, there has been considerable scholarly effort to ascertain how electoral rules affect the number of parties in a legislature (see, among many others, Benoit, 2001; Cox, 1997; Rae, 1967; Lijphart, 1990; Taagepera and Shugart, 1989, 1993). Lower district magnitudes generate a smaller number of parties via a mechanical and a psychological effect. The mechanical effect refers to the way in which votes are converted into seats: in low district magnitudes this conversion is to the benefit of larger parties. The psychological effect refers to how – in anticipation of the mechanical effect – politicians will build parties large enough to win seats, and voters will vote strategically for parties having a chance to win a seat, thereby further decreasing the number of parties (see Benoit, 2006). In the last decades, much work has been invested to quantify the effect of district magnitude on the number of parties.[2] Using ever more sophisticated methods, a robust increasing (and concave) association has been identified. In a recent contribution, Blais et al. (2011) use quasi-experimental methods to estimate the causal effect of electoral systems on the effective number of parties and decompose this effect into its mechanical and psychological components.

Given the considerable scholarly effort invested into assessing the relationship between district magnitude and the number of parties, it is surprising that almost no attention has been devoted to the role of legal thresholds. Legal thresholds have a clear mechanical effect on the number of parties and, precisely because of this, and in the same way as district magnitude, can give rise to a psychological effect as well. The combination of the two effects could be large, potentially as important as that of district magnitude. However, to the best of our knowledge, the only study that compares the effect of legal thresholds and district magnitude is Moser's (1999) article on elections in

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[2] Examples include Blais et al. (2011), Clark and Golder (2006), Lijphart (1990), Pappalardo (2007), Reed (2001), Singer and Stephenson (2009), Taagepera and Shugart (1989, 1993).

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post-communist states. His findings suggest that the effect of legal thresholds can be stronger than that of low district magnitudes. However, because he uses observational data, it is not clear if his results can be interpreted causally.

Indeed, obtaining causal estimates of the effect of the legal threshold on the number of parties is not straightforward. Cross country studies are likely to yield biased estimates, because thresholds are imposed for political reasons related to party systems. Therefore, countries that impose higher legal thresholds are likely to differ from countries that do not impose them in relevant ways, some of which are probably difficult to control for. One could alternatively focus on one or a small subset of countries that might have changed their legal threshold between two elections and compare the number of parties in the two elections. However, again, other factors relevant for the party distribution might have changed between the two elections and it will generally not be possible to disentangle between the effect of the threshold and these other factors.

In this paper, we estimate the effect of the legal threshold on the number of parties and decompose it into its psychological and mechanical components, using a quasi-experimental approach. We study the case of Morocco, whose 2003 and 2009 local elections afford a rare opportunity to uncover the causal effect of the legal threshold. We exploit two features of the Moroccan case. First, municipalities below a certain population cut-off have a majoritarian system, whereas those above that level have a proportional system. Second, the legal threshold changed in the municipalities with the proportional system from 3% in the 2003 elections to 6% in the 2009 elections. Because the increase in legal threshold applies only to municipalities with a proportional system, a differences-in-differences approach can be used to control for other relevant factors by using the municipalities with a majoritarian system. The validity of the approach is strengthened by focusing on municipalities close to the population cut-off that determines the electoral system. These municipalities provide valid treatment and control groups because they are likely to be, on average, very similar.

We use municipal level data merging electoral results from the 2003 and 2009 elections and population data from the 1994 and 2004 censuses. An important limitation of our electoral data is that it does not include information on votes, but only on seats.

We find a large effect of the increase in legal threshold on the number of parties, implying that a one percentage point increase in the threshold leaves one effective party out of the council. Our results suggest that for councils of around 25 seats, a proportional system with a 6% legal threshold is equivalent to a majoritarian system in terms of number of parties. These results are consistent with the effective threshold models by Lijphart (1994) and Taagepera (1998, 2002).

The total effect of the legal threshold has only limited interest, as it conflates the mechanical and psychological effects. The mechanical effect is, in some sense, trivial, and likely to be very context-specific. If our results were purely driven by the mechanical effect, all they would be telling is that there are many small parties in Morocco, something that is already well known. What is interesting is to obtain insights on the psychological effect. Is the behavior of parties and voters affected by the legal threshold? And if so, by how much? These questions are of particular interest in the context of developing and semi-democratic countries. There, it is by no means clear if there are sufficient incentives to behave strategically when it comes to elections that might matter little after all. In this respect, the case of Morocco is of considerable interest as it exemplifies precisely such countries.

We thus decompose the total effect of the legal threshold into its mechanical and psychological components. We perform this decomposition simulating a counterfactual distribution: applying a 6% threshold to the 2003 distribution of seats. When compared to the actual 2003 distribution, this counterfactual captures the purely mechanical effect. The difference between the actual 2009 distribution and the counterfactual then captures the psychological effect (the difference emerging from strategic calculations of voters and parties). Our approach is valid to the extent that the 2003 distribution can be used as a basis for the 2009 counterfactual; i.e. if the difference between the 2003 and 2009 distributions indeed comes mainly from the increase in legal threshold. We check this by comparing the seat distributions in 2003 and 2009 for the *majoritarian* municipalities finding that indeed the distribution of seats has barely changed.

Using this decomposition, we compute the relative importance of the mechanical and psychological effects for the (effective) number of parties. We find that the mechanical effect accounts for around 75% of the total effect while the psychological effect accounts for around 25%. Still, the absolute value of the psychological effect is large: it implies that an increase in the legal threshold of 3 pp leaves out of the council almost one effective party, for purely strategic reasons. Put in the Moroccan context where it is unclear how meaningful elections are and where moreover the higher threshold was newly introduced, this appears like a considerable amount of strategic behavior from voters and politicians. We discuss as plausible drivers of the effect's large size the uncertainty about party support and the lack of programmatic parties in Morocco. Lack of information about a specific party's support may lead to an over-reaction to the threshold. In turn, the lack of programmatic ambitions implies that parties (and candidates) are pure short-term seat maximizers who will desert parties threatened by the threshold. In this way, it would be precisely the semi-authoritarian, clientelistic character of Moroccan elections that would prompt high levels of strategic behavior. Consequently, we would expect the psychological effect to be smaller in systems where parties are more programmatic and institutionalized.

The paper is organized as follows. Section 2 gives a brief background on Moroccan parties and electoral rules. Section 3 estimates the effect of the legal threshold on the number of parties, contrasting it to the effect of district magnitude. Section 4 decomposes the total effect into its mechanical and psychological components. Section 5 concludes.

2. Party system and electoral rules in Morocco

Morocco's political system is a monarchy that combines authoritarian with representative institutions. The King

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decides on core policies but the elected government has a say. Political liberalization measures in the 1990s increased the role and prerogatives of democratic institutions (Storm, 2007). Political reforms included constitutional reforms that strengthened elected representatives vis-a-vis the regime as well as measures that increased the transparency and fairness of elections considerably.[3] Nevertheless, King Hassan II and his successor King Mohammed VI generally remained in firm control of the pace of political reforms. Very low turnout in elections held in the 2000s in combination with large number of purposeful null votes suggests that Moroccan voters are generally aware of the limitations faced by their elected representatives.[4]

Multipartism has existed since the country's independence in 1956 and political parties – of regime supporters and the opposition – are well-established.[5] At the same time, the party system is highly fragmented and not very institutionalized with frequent party splits, considerable shifts in voters support, and frequent floor-crossing.[6] The most important parties supporting the regime are the Popular Movement, the National Rally for Independents, the Constitutional Union, and the Authenticity and Modernity Party (PAM). While typically being referred to as "regime parties" or "parties of the administration", they do not advocate specific political platforms but are first and foremost clientelistic (see Pellicer and Wegner, 2012a). Consequently, their level of institutionalization is low and floor-crossing is ubiquitous as their politicians join whichever party offers them better prospects. Opposition parties, in contrast, have generally a higher level of organization and programmatic ambitions, namely the promotion of political reforms. This is especially true for the Islamist Party of Justice and Development (PJD) while the other two key "historical" opposition parties, the Socialist Union of Popular Forces (USFP) and the *Istiqlal* (Independence) Party (PI) have gradually been abandoning their programmatic linkage strategies in favor of more clientelistic ones.

Between the 2003 and 2009 municipal elections, the electoral fortunes of numerous parties changed. For example, the Islamist PJD increased its number of seats considerably whereas the support of the USFP deceased overall and became much more rural. The most important change, however, was the appearance of a new regime party, the PAM. It was founded in 2008 by a few influential individuals, most importantly Fouad Ali Al-Himma, typically referred to as "the king's friend" (Wegner and Pellicer, 2009; Liddell, 2010; Koehler, 2010) and a coalition of five small regime parties in 2008. Before the subsequent local elections in 2009, it additionally engaged in the 'large-scale adoption of nomads from other political parties' (Eibl, 2012). In 2009, the PAM won the largest number of seats.

Morocco's electoral system was reformed in the early 2000s. Up until then, parliamentary and municipal elections were held under a single member plurality (SMP) system, supposed to benefit the regime and preferred by parties based on the support of notables (Lust-Okar and Jamal, 2002; Ferrié, 2002) Opposition parties had been demanding a PR system to strengthen programmatic voting. Fearing further fragmentation of the party system, however, they had also been asking for a legal threshold. The new system was then a compromise between these interests.

At the national level, the electoral system was changed to closed-list PR with relatively small districts.[7] At the municipal level, a mixed system was adopted with the specific system depending on the population size of the municipality. In the 2003 municipal elections, SMP was maintained for towns with less than 25,000 inhabitants. In towns with more than 25,000 inhabitants, councilors were elected under a PR, closed list, system. For the 2009 elections, the population threshold was increased to 35,000 inhabitants. The district magnitudes for PR towns are identical with the council size. In 2003, the minimum was 25 seats, in 2009, 29 seats. For the PR municipalities, legal thresholds were established. Initially, the threshold was set at three per cent; after the 2003 elections, it was raised to six per cent.

3. Legal thresholds and the number of parties

The causal effect of the legal threshold on the number of parties can be identified using a differences-in-differences approach exploiting two institutional features of the Moroccan local elections. First, the fact that the legal threshold changed between the 2003 and the 2009 elections, from 3% to 6%. This allows us to obtain a "naive" estimate of the effect of the legal threshold by comparing the average number of parties in the two elections. This estimate is naive because many other factors might have changed between the two election years that might confound the effect of the increase in threshold. In order to control for these factors, we use the second institutional feature: the fact that, in both elections, some municipalities used a majoritarian system (those with population below a given cut-off) and some a proportional one (those with population above that level). This implies that the change in legal threshold applied only to some municipalities, those with a proportional system. Thus one can use the municipalities with a majoritarian system as a control group. In particular, we focus on municipalities around the population cut-off where the electoral system changes. These municipalities are likely to be very similar, except for electoral system. Therefore, among these, the majoritarian ones constitute a valid control group for the proportional ones. In summary, we estimate the effect of the legal threshold by focusing on municipalities around the population cut-off, computing the change in number of parties between 2003 and 2009 for municipalities with proportional systems, and netting out from this the change in majoritarian municipalities.

[3] Examples are the purging of the voters' lists and the establishment of a new electoral code which also guaranteed the financing of the parties' electoral campaigns and their access to public radio stations and television.

[4] See Pellicer and Wegner (2012b) for a discussion of turnout in the 2007 parliamentary election.

[5] For Moroccan political parties, see especially Santucci (2001) and Willis (2002).

[6] In Morocco, a big party wins around ten to fifteen per cent of the seats. Szmolka (2010) counts 15 effective electoral parties and 10.1 effective legislative parties in the 2007 parliamentary elections.

[7] In 2002, the average district magnitude was 3.3 seats.

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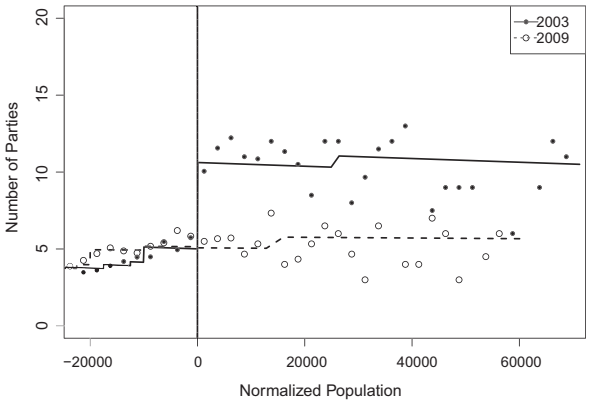

Fig. 1. Number of parties.

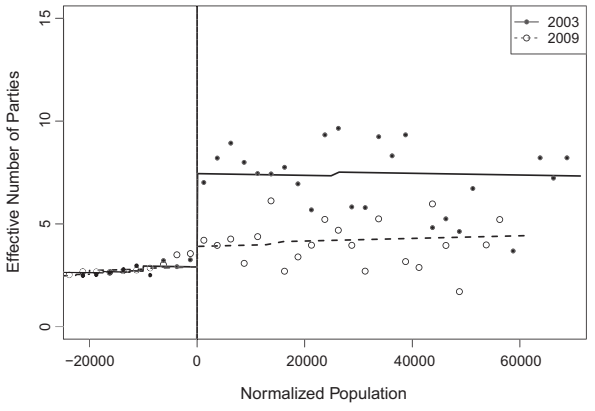

Fig. 2. Effective number of parties.

To implement our approach we use municipal level data on electoral results from the 2003 and 2009 Moroccan local elections and on population from the 1994 and 2004 census.[8] The electoral data contains only information on the seats won by each party, with no information on votes.[9] From this data, we calculate the number of legislative parties in each municipality, the effective number of legislative parties (defined as $1/\sum_j s_j^2$), where s_j is the share of seats won by party j (Taagepera and Shugart, 1993), as well as the assembly size (total number of councilors in each municipality). The two elections/population years have been merged resulting in a longitudinal dataset with 1449 municipalities observed during two periods.[10]

Figs. 1 and 2 show the graphical implementation of our approach, for the number of parties and for the effective number of parties, respectively. The figures show these variables as a function of population, distinguishing between 2003 and 2009. The dots in the figures are the average (effective) number of parties in population windows of 2500. The lines are the fitted values from regressions that allow for differential effects by electoral system and by year (see below).[11] A vertical line depicts the population cut-off where the electoral system turns from majoritarian to proportional.[12]

The first thing to notice in the figures is that the number of parties has barely changed for the majoritarian municipalities, those to the left side of the relevant population threshold. This means that our control group has remained basically stable so that virtually all the change experienced in proportional municipalities can be attributed quite safely to the change in legal threshold. The figures show that this change is actually quite substantial, leading to a decrease in number of parties of around five, and somewhat less when it comes to the effective number of parties. These observations apply for all population levels, including those around the population cut-off where the electoral system changes.

An alternative way of reading the figures is by focusing on the jumps in number of parties when the system becomes proportional, in 2003 and in 2009. This corresponds to the causal effect of PR in 2003 and 2009. For 2003, the number of parties doubles from around five in the majoritarian towns close to the threshold to more than ten for those on the proportional side. The size of the jump in the effective number of parties is only slightly smaller. For 2009, there is no discernible jump at all for the number of parties and a small one for the effective number of parties.[13] This implies that, in terms of number of parties, whereas a 3% leaves out relatively few parties from the legislature, a 6% threshold is essentially equivalent to a majoritarian system, in that both leave out as many parties from the council.

The regression counterpart of the figures is presented in equation (1):

$$N_{it} = \beta_0 + \beta_1 p_{it} + \beta_2 p_{it} \times D_t + \gamma\, Prop_{it} + \alpha\, Prop_{it} \times D_t + \beta_3 AS_{it} + \varepsilon_{it} \quad (1)$$

[8] All data is publicly available. The 2003 electoral data can be found at http://www.elections2003.ma, and that of 2009 at http://www.elections2009.gov.ma. The population data for 1994 and 2004 were published in the Moroccan Décret 2-05-189 2nd December 2005.

[9] See Pellicer and Wegner (2012a) for details of the construction of the dataset.

[10] Our identification strategy partly relies on the fact that the electoral system changes at a given population level. Thus, ideally, we would use the population data used by the administration to implement the policy. This turns out to be the case for the 2003 elections. However, due to redistricting in 2008, the 2009 electoral formula does not perfectly correspond to the 2004 population data: ten municipalities that ought to be proportional on the basis of their 2004 population turn out to be majoritarian and vice-versa. For this reason, in the regressions below, we instrument the electoral system by the relevant population indicator.

[11] There are two differences between the regressions below and those used in the figures. First, the figures refer to the "reduced form" of the instrumental variable regression, where the outcome is regressed directly on the assignment variable Z_{it} (see footnote 13). In the same vein, secondly, instead of using the actual number of assembly seats, we use the ones assigned by the respective population levels. These changes make the figure smoother and easier to visualize without affecting the main message that the figures convey.

[12] To ease comparison between the two years, the population data have been normalized to equal zero at the population cut-off.

[13] The small additional jumps in the figures at other population levels correspond to the effect of assembly size.

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Table 1
Effect of proportionality and the legal threshold on the number of parties.

	Number of parties	Effective number of parties
Legal threshold	−5.847*** (0.437)	−3.347*** (0.329)
PR in 2003	5.413*** (0.256)	4.606*** (0.193)
R-squared	0.409	0.365
N	2898	2898

Standard errors in parenthesis. Signif. codes: 0.01 '***' 0.05 '**' 0.1 '*'. Coefficients from a TSLS regression of different measures of number of parties. The endogenous variable is the indicator of proportionality and is instrumented by an indicator of population being higher than 25,000 (35,000 for 2009 observations). Other exogenous variables includes 2009 dummy, population, and assembly size.

where i indexes municipalities and t indexes years (2003 or 2009). N_{it} is our outcome variable, either the number of parties or the effective number of parties in municipality i in year t. p_{it} is the population of the municipality in a given year. Prop_{it} is an indicator function measuring whether the electoral system is proportional as opposed to majoritarian. D_t is an indicator of the given year, taking value one for observations in 2009. AS_{it} is the number of seats in the assembly and ε_{it} is an error term.

The key coefficient of interest is α, which represents the effect of the increase in legal threshold from 3% to 6%. This is because α is the coefficient of the interaction between the proportional system and the 2009 dummies, and so it captures how much more the number of parties changed from 2003 to 2009 in the proportional municipalities relative to the majoritarian ones; i.e. the regression implementation of the differences-in-differences estimator. Because the regression controls for population, this coefficient measures the differences-in-differences for municipalities around the population level where the electoral system changes.[14]

Another coefficient of interest in equation (1) is γ. γ estimates the causal effect of the proportional system in 2003: the jump in number of parties when the system becomes proportional in 2003, controlling for population. Given that in 2003 the proportional system had a threshold of only three per cent we believe that this effect can approximate the effect of district magnitude from 1 to 25.

Table 1 displays the two coefficients of interest. The results confirm the message in the figures. The first row shows that the increase in legal threshold from 3% to 6%, leads to a *decrease* of 5.8 parties, and of 3.3 effective parties. This is a very large effect. It implies that each percentage point increase in the legal threshold leaves out almost two parties (and one effective party) from the council. The second row shows the effect of district magnitude: as the system becomes proportional (in 2003, with a threshold of 3%) the legislature gains 5.4 more parties, and 4.6 more effective parties. This estimate is, to a linear approximation, similar to the one found in Blais et al., (2011) for Switzerland, also using a quasi-experimental approach. They find that an increase in district magnitude to, on average, 7.7 is associated to a 1.7 increase in effective parties. In our case, the increase in district magnitude is around 3 times bigger (25 as opposed to 7.7), and the increase in effective number of parties is also around 3 times higher (4.5 as opposed to 1.5).[15]

Our results are consistent with the models of effective threshold proposed by Lijphart (1967) and Taagepera (1998, 2002). According to these models, the effective threshold at the district level is: $0.75/M+1$, where M denotes district magnitude. This formulation applies to our PR municipalities, where councils and district coincide. For majoritarian municipalities, each council comprises several districts, each with magnitude one. The appropriate concept is then the "nationwide threshold of representation" from Taagepera (2002), which in our case reads: $0.75/2^*\sqrt{S}$, where S is the number of seats in the council. Applying these formulas to the municipalities close to the relevant population cut-off leads to the following effective thresholds in proportional municipalities of 2.9% and 2.5% in 2003 and 2009, respectively. For majoritarian municipalities, the figures are: 7.8% and 7.2%. These figures give a number of insights. First, the legal threshold of 3% in 2003 was probably not very binding given that the effective threshold was 2.9%. Second, the increase in number of parties we observe in 2003 from the majoritarian to the PR towns is consistent with the considerably lower effective threshold in PR towns in 2003 (2.9% vs. 7.8%). Finally, and most remarkably, the fact that we do not observe a dramatic difference between PR and majoritarian in 2009 is consistent with the effective threshold of 7.2% being relatively similar to the PR legal threshold of 6%. Actually, in agreement with these figures, PR municipalities display slightly more effective parties than majoritarian ones in 2009, as shown in Fig. 2).

4. Mechanical vs. psychological effect of legal thresholds

The previous section documents a large effect of the legal threshold on the number of parties in the local council. Whether this is interesting or not depends on what drives this effect. If the effect is purely mechanical it will have no interest, as it will simply correspond to the

[14] If our population variables were the ones used to implement the electoral law, the variable Prop would be (conditionally) exogenous and we could estimate equation (1) using OLS. Because this is not always the case, the indicator for proportionality could be endogenous. Hence, we estimate equation (1) using two stage least squares, using as instrument the (conditionally exogenous) "assignment variable" Z_{it} given by: $Z_{it} = \begin{cases} 1 & \text{if } p_{it} > \tilde{p}_t \\ 0 & \text{if } p_{it} \leq \tilde{p}_t \end{cases}$ where $\tilde{p}_t$ is the population level at which the electoral system is supposed to change (25,000 in 2003 and 35,000 in 2009). The instrument is fairly strong, given that there are only 10 non-compliant observations (with proportional system when assigned by their population to be majoritarian or vice-versa).

[15] Notice, however, that the effect of district magnitude is likely not to be linear so that, in some sense, our results probably reflect a larger effect in Morocco than in Switzerland. This is probably because, as mentioned above, the Moroccan party system is remarkably fragmented.

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amount of parties generally earning between 3% and 6% of the vote. However, as in the case of district magnitude, the mechanical effect can give rise to a psychological effect as well. As parties and voters learn that the legal threshold has increased, they will adapt their strategy. Presumably, parties will coalesce in order to maximize the chances of not being barred from the threshold. From the voters' side, supporters of small parties, in turn, reasoning that their party might not cross the threshold, might strategically vote for larger parties. The total effect of an increase in legal threshold is thus likely to be stronger than the purely mechanical one, leading to even less parties in the legislature. The estimate we have obtained in the previous section is the total effect, the combination of the mechanical and the psychological effects. This section tries to disentangle and quantify the two components.

The conceptual and empirical difficulty of distinguishing between the mechanical and the psychological effect is that they can generally not be observed in isolation. We conceptualize the mechanical effect of a given threshold as the number of parties with votes below that threshold, but in the counterfactual situation where neither parties nor voters know that the threshold exists. The psychological effect is then the difference between the actual number of parties below the threshold and the mechanical effect. In order to disentangle between the two, one needs to generate the counterfactual distribution of votes that would result if the threshold was there, but parties and voters did not know about it. Then the mechanical effect would be the number of parties with votes less than the threshold in that distribution. The practical question is how to construct this counterfactual distribution.

In our case, we believe a credible counterfactual distribution can be generated on the basis of the distribution of votes in 2003. The motivation for this comes from the results in the previous section, showing that the number of parties have remained essentially unchanged in municipalities with majoritarian systems. Under the assumption that little of relevance for the number of parties has changed between the two years, the distribution of votes in 2003 in proportional municipalities can be used to generate the counterfactual for 2009. The counterfactual is generated by applying the 6% threshold to the 2003 distribution. This counterfactual would display a threshold of 6%, but in a context where neither parties nor voters had internalized it; thus, it is precisely the counterfactual distribution needed to compute the mechanical effect. The mechanical effect is then given by the difference between the counterfactual and the actual 2003 distribution, while the "residual" (the difference between the actual 2009 distribution and the counterfactual) gives the psychological effect. This decomposition approach bears resemblance, yet is slightly different from the one used in Blais et al. (2011) to estimate the psychological and mechanical effect of (mainly) district magnitude. In their case, the simulated distribution is designed to capture the psychological effect and the mechanical effect is computed as a "residual". In our case the opposite is true. By construction, therefore, our decomposition will tend to deliver a lower psychological component than the one used by Blais et al. (2011).[16]

There are two challenges in order for us to implement our approach in a convincing way. First, whether the approach works or not hinges on whether the 2003 distribution in proportional municipalities can stand as counterfactual for 2009. Second, we do not have data on votes, but only on seats. Thus, even if the 2003 distribution can be validly used as counterfactual, how can we apply the 6% threshold of votes? We tackle these questions in what follows, starting with the issue of votes vs. seats.

In general, the mapping between votes to seats in proportional systems is not totally straightforward when district magnitudes are not very large. In our case, this problem can be solved by the rather lucky fact that the municipalities of interest for us (the proportional ones close to the population cut-off) have 25 councilors, which is the "right" number of councilors for our purposes. In the Moroccan system with largest remainder, this means that 4% of votes assures you a seat in the council while 8% of votes assures you two seats. Parties obtaining between 4% and 8% of the vote might or might not obtain the second seat, depending on the distribution of remainders among the other parties. On average, parties with 6% or less will end up with one seat, whereas those between 6% and 8% will end up with two. Therefore, erasing parties that obtain one seat in such municipalities corresponds, on average, to erasing parties with less than 6% of vote, precisely what our counterfactual distribution requires.[17] We thus proceed focusing on municipalities with population and council seats closest to the population cut-off, and we use distributions of seats instead

[16] Blais et al. (2011) consider the difference between PR and non PR systems. Their counterfactual distribution is based on the non-PR distribution, to which they apply a PR system. Relative to the PR distribution, this distribution incorporates the calculations of voters and parties from non-PR, but not the non-PR way of transforming votes into seats; i.e. it corresponds to the psychological effect. The rest (the difference between the non-PR distribution and the counterfactual) is then the mechanical effect. In their case, thus, psychological effects are considered first and mechanical effects are computed as a residual. Our case is the opposite, with mechanical effects considered first and psychological ones being the residual. With the data used by Blais et al., our decomposition would correspond to using as counterfactual the PR election, and applying to it the non-PR system of transforming into votes. This would yield the mechanical effect leaving the psychological effect as residual. Conversely, theoretically we could reach their type of decomposition by taking the distribution of votes in the 2009 elections (with the 6% threshold) and applying to it a 3% threshold. We cannot implement this approach, however, because we lack information on votes. The two decomposition approaches will generally differ in their results, and it is not clear which type of decomposition is more appropriate. For instance, the decomposition used by Blais et al. could yield a zero mechanical effect if agents perfectly internalize the consequences of different systems. It is not completely clear if this is a desirable outcome to the extent that the psychological effect arises if and only if there is a mechanical effect and a result of this type would obscure this fact. With our decomposition, in contrast, a zero mechanical effect is extremely unlikely to happen.

[17] Notice that it would be wrong to erase in general parties with less than 6% of seats. This would overshoot the parties erased. To see why consider a municipality with 17 councilors where one seat is assured with 6% and two seats are assured with 12%. Erasing all parties with 1 seat would, not only erase all parties with votes less than 6%, but also a large proportion of parties obtaining 7%, 8% and 9%.

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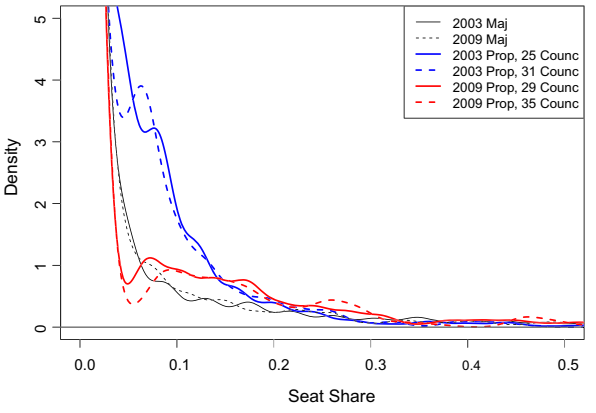

Fig. 3. Actual distributions of seats. Kernel density estimation of seat shares in municipalities with different electoral systems, different years and different number of councilors. The bandwidth used for estimation is 0.016. The figure includes two separate distributions for 2003 proportional elections and two for 2009 proportional elections. For 2003, these correspond to municipalities with 25 and 31 councilors (29 and 35 for 2009).

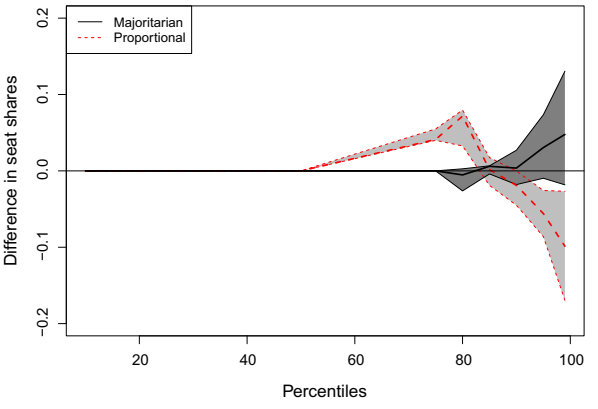

Fig. 4. Difference in actual distributions of seats with 90% confidence intervals. Difference between 2003 and 2009 distributions, for majoritarian and proportional elections. The confidence intervals are computed using the procedure in Wilcox et al. (2013).

of votes. Our counterfactual distribution will thus be the 2003 seat distribution, but subtracting the seats from parties that obtain only one seat and redistributing these seats proportionally to the rest of parties in the council.

We now turn to whether the 2003 distribution can credibly be used as a basis for a valid counterfactual; i.e. if we can credibly claim that the key changes in number of parties between 2003 and 2009 can be mainly attributed to the rise in legal threshold. Notice that this does not require claiming that the electoral results of given parties have remained unchanged. Rather we require the overall distribution of seats, regardless of who gained which amount to have remained roughly stable. While we cannot check this directly, we can again use the differences-in-differences logic and compare majoritarian municipalities in 2003 and 2009. As already emphasized, from the figures above it is clear that the number of parties in majoritarian municipalities remains, on average, essentially unchanged. We can now go one step further and check, not only the average number of parties, but also the full distribution of seats in 2003 and 2009.

Fig. 3 shows the distribution of seats in municipalities close to the population cut-off for 2003 and 2009. The thin lines correspond to the municipalities with majoritarian systems. It is clear that the distribution of seats in majoritarian municipalities is indeed very similar in the two years. The figure also shows the distribution of seats in municipalities with proportional systems for 2003 (solid lines) and 2009 (dashed lines). It is apparent that these distributions differ markedly: there are substantially more parties obtaining between 5% and 15% of the seats in proportional municipalities in 2003, compared to 2009.[18] Fig. 4 shows the statistical significance of these differences by plotting the differences in quantiles between the 2003 and 2009 distributions, separately for the majoritarian and the proportional elections, including the 90% confidence band.[19] The differences between 2003 and 2009 are indistinguishable from zero for majoritarian elections but statistically significant for proportional ones. The fact that the distributions for majoritarian elections in the two years appear statistically indistinguishable gives us confidence in interpreting the distributional differences observed in proportional elections as driven mainly by the change in legal threshold. This is the change we are trying to decompose into a mechanical and a psychological effect.

We then proceed to simulate a distribution that can serve as counterfactual for 2009 in order to compute the mechanical effect. We take the 2003 distribution and apply a 6% legal threshold as mentioned above. Fig. 5 shows the simulated distribution, together with the actual 2003 and 2009 ones. The simulated distribution appears with a thick dotted line. Compared to the actual 2003 distribution, the simulated one indeed displays a blip around 0.05 reflecting the application of the 6% threshold. This blip brings it closer to the 2009 actual distribution and corresponds to the mechanical effect. However, it is clear that there is more than the mechanical effect: the simulated distribution still differs substantially from the 2009 actual distribution. The most noticeable difference is a large hump around 0.1: a large fraction of parties would have gotten around 10% of the vote in 2003, even if a 6% threshold had been mechanically applied. This is then compensated by a larger density of parties obtaining more than 25% of seats in 2009.

The difference between the 2009 actual distribution and the simulated counterfactual is precisely what one would expect from the psychological effect. As voters and parties anticipate a larger threshold, parties at risk of falling below the threshold would either try to coalesce with other

[18] In order to check the robustness of the differences observed between 2003 and 2009 in proportional municipalities we show two lines for proportional municipalities in 2003 and in 2009. For each year, these lines correspond to municipalities with number of councilors closest and second closest to the population cut-off, respectively (25 and 31 councilors for 2003, and 29 and 35 for 2009) The figure makes clear that the distributions within each year are very similar so that the differences between the two years appear robust.

[19] To compute confidence intervals, we use the method from Wilcox et al. (2013), designed to be robust to distributions with many tied values, such as ours.

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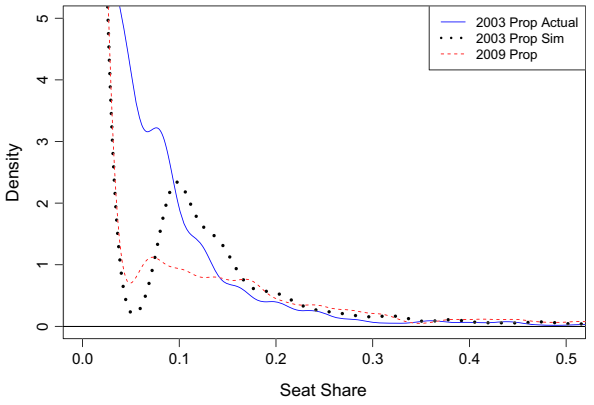

Fig. 5. Actual and simulated distributions of seats. Kernel density estimation of seat shares in municipalities with proportional systems closest to the population cut-off in 2003 and 2009. The figure also shows the simulated 2003 distribution when imposing a 6% threshold. The bandwidth used for estimation is 0.016.

parties or not run. In addition, voters would stay away from these parties and strategically vote for larger parties with no risk of falling below the threshold. As a result voters' and parties' behavior, larger parties would be rewarded and one would observe a higher prevalence of parties with large share of votes. The figure thus suggests the existence of a non-trivial psychological effect.

We now proceed to quantify the role of the mechanical and psychological effects for the number of parties. The total effect of the increase in legal threshold from 3% to 6% is estimated simply as the difference in number of parties between 2009 and 2003 for the municipalities with proportional systems. We then compute the number of parties in this counterfactual distribution. The difference between the number of parties in the counterfactual distribution and those in the actual 2003 number is the mechanical effect. The remaining is the psychological effect. We perform the exercise both for the number of parties and for the effective number of parties. The results are shown in Table 2.

Most of the effect comes in our case from the mechanical effect. This effect represents 88% when using number of parties and around 75% when using the effective number of parties. Still, the psychological effects we estimate are substantial, implying that the increase in threshold from 3% to 6% has left on average almost one effective party out of the council, for purely strategic considerations of parties and voters. This estimate is actually very close to those found by Blais et al. (2011) for the psychological effect of (mainly) district magnitude in Japan and Switzerland, even if our decomposition is somewhat different than theirs. Because their decomposition gives somewhat primacy to the psychological effect and treats the mechanical effect as residual, the surprising aspect of their findings is actually that their estimated psychological effect is so low. With our approach, that gives primacy to the mechanical effect and treats the psychological effect as residual, our conclusion is rather the opposite, that the psychological effect is surprisingly large, particularly considering a case like Morocco, where elections are not that meaningful and the PR system and the larger 6% threshold were only introduced in 2003 and 2009, respectively. It appears that voters and parties nevertheless behaved in a surprisingly strategic manner.

Table 2
Decomposition of total effect of legal threshold into mechanical and psychological effects.

	Number of parties	Effective number of parties
Actual 2003	10.8	7.6
Simulated 2003	6.2	5.2
Actual 2009	5.6	4.4
Total effect	−5.3	−3.2
Mechanical effect	−4.6	−2.4
Psychological effect	−0.6	−0.8

Two characteristics of the Moroccan party system are plausible drivers of the threshold's large psychological effect. The first is the low level of institutionalization of most parties, and, generally, of the Moroccan party system. This leads to both parties and voters having little reliable information on a specific party's level of support in an upcoming election. Not knowing how threatened a party is by the threshold, parties and voters possibly 'overshoot' in their strategic considerations.

The second driver could be the lack of programmaticness of most Moroccan parties. Indeed, Blais et al. (2011), argue that the *small* size of their psychological effect might come from parties that are not short-term seat maximizers, i.e. they have goals that go beyond actual seats and field candidates in elections they know they cannot win. In contrast, the absence of such programmatic goals for most Moroccan parties implies that the election of their candidates is their sole purpose and that politicians feel little loyalty for a specific party. Accordingly, politicians that feel threatened by the 6% threshold should have a strong reaction either by deserting a losing (too small) party or by attempting to form a bigger one.

That possible strategic 'overshooting' is accounting for the psychological effect is obviously unobservable. However, the second proposed driver of the psychological effect for politicians can be seen in action in the formation and evolution of the Authenticity and Modernity Party (PAM). As mentioned above, the PAM emerged only one year before the 2009 election as a coalition of smaller "regime" parties. Had they not coalesced, these small parties would have been devastated by the introduction of the 6% threshold in the 2009 election.[20] This is not to say that the creation of the PAM was purely the outcome of the new threshold. However, part of the PAM's rationale from the regime's point of view was certainly to help rationalizing

[20] We have computed that among proportional municipalities close to the population cut-off these parties would have lost representation in between 40% and 70% of the municipalities where they succeeded in gaining seats in 2003.

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the party system and to create a regime party strong enough to confront the Islamist Justice and Development party in elections (see Eibl, 2012; Koehler, 2010). The high threshold was then an important incentive for small parties and individual candidates from other parties to join the PAM.[21]

To the extent that the size of our psychological effect is linked to these two characteristics of the Moroccan party system, we would expect it to be similar in developing countries with strong prevalence of clientelistic parties and/or systems where party systems are not very institutionalized, and vice-versa.

5. Concluding remarks

Legal thresholds can have mechanical and psychological effects on the number of parties similar to those of district magnitude and the electoral formula. Yet, virtually no attention has been given to quantify them. In this paper, we have provided an estimate of the causal effect of legal thresholds using a quasi-experimental approach that exploits institutional features of the Moroccan 2003 and 2009 local elections. We find a large effect of the legal threshold on the number of parties.

We then decompose this effect into its mechanical and the psychological components. A priori, there are reasons to believe that the psychological effect might be small in a country like Morocco, where election results might have only limited real impact. However, we find a considerable psychological effect: the increase in the legal threshold from 3% to 6% leads to almost one less effective party in the council, for purely strategic reasons. We believe the reason for this large effect are, on the one hand, high levels of uncertainty of electoral support in a weakly institutionalized party system, and, on the other, the clientelistic nature of Moroccan elections. Parties with little social roots and elections with little programmatic value that are all about winning seats could thus be prompting particularly strong 'psychological' effects of thresholds. This discussion implies that in semi-authoritarian/clientelistic settings one would probably expect the psychological effect to be driven mainly by parties, rather than by voters. Unfortunately, given that we only have data on seats, and not on votes, we cannot test this for our case. We hope that further research will help shedding light on this issue.

[21] Even if we believe that the creation of the PAM illustrates well the psychological effect, it is important to verify that our results are not fully driven by the PAM. We check this by introducing the PAM in our simulations. In particular, we "construct" the PAM in 2003 and resimulate the distribution of seats with the constructed PAM in addition to the 6% threshold. Because we cannot know exactly from where did the PAM obtain its support, we make two simulations that serve as lower an upper bound. As lower bound, we construct a "2003 PAM" adding up the seats of the five small parties that formally coalesced to make up the PAM. This is a lower bound because the PAM in 2009 obtained many more seats than these five parties combined in 2003. As upper bound, we include, in addition, other parties from where the PAM absorbed considerable amounts of candidates. The (unreported) resulting figure (available upon request) shows clearly that the appearance of the PAM does not account for the bulk of our results. In particular, the hump in the simulated 2003 distribution around 0.1 remains, even when accounting for the PAM: most of the parties obtaining around 10% of the vote in 2003 do not appear to be actually linked to the PAM.

References

Benoit, K., 2001. District magnitude, electoral formula, and the number of parties. European Journal of Political Research 39, 203–224.
Benoit, K., 2006. Duverger's law and the study of electoral systems. French Politics 4, 69–83.
Blais, A., Lachat, R., Hino, A., Doray-Demers, P., 2011. The mechanical and psychological effects of electoral systems. Comparative Political Studies 44, 1599–1621.
Clark, W.R., Golder, M., 2006. Rehabilitating Duverger's theory. Comparative Political Studies 39, 679–708.
Cox, G.W., 1997. Making Votes Count: Strategic Coordination in the World's Electoral Systems. Cambridge University Press, Cambridge, U.K.; New York.
Duverger, M., 1954. Political Parties, Their Organization and Activity in the Modern State. Methuen; Wiley, London; New York.
Eibl, F., 2012. The party of authenticity and modernity (PAM): trajectory of a political deus ex machina. The Journal of North African Studies 17, 45–66.
Ferrié, J.N., 2002. Fin de partie: l'échec politique de l'alternance et la transition prolongée. Annuaire de l'Afrique du Nord, 308–324.
Koehler, K., 2010. All the King's men: the emergence of the authenticity and modernity party (PAM) in Morocco. IPRIS Maghreb Review, 1–2.
Liddell, J., 2010. Notables, clientelism and the politics of change in Morocco. The Journal of North African Studies 15, 315–331.
Lijphart, A., 1994. Electoral Systems and Party Systems: a Study of Twenty-seven Democracies, 1945–1990. Oxford University Press, Oxford.
Lijphart, A., 1990. The political consequences of electoral laws, 1945–85. American Political Science Review, 481–496.
Lust-Okar, E., Jamal, A.A., 2002. Rulers and rules: reassessing the influence of regime type on electoral law formation. Comparative Political Studies 35, 337–366.
Moser, R., 1999. Electoral systems and the number of parties in post-communist states. World Politics 51, 359–384.
Pappalardo, A., 2007. Electoral systems, party systems. Party Politics 13, 721–740.
Pellicer, M., Wegner, E., 2012a. Electoral Rules and Clientelistic Parties: a Regression Discontinuity Approach. Working Paper 76.
Pellicer, M., Wegner, E., 2012b. Socio-economic voter profile and motives for Islamist support in Morocco. Party Politics. http://dx.doi.org/10.1177/1354068811436043.
Rae, D., 1967. The Political Consequences of Electoral Laws. Yale University Press, New Haven.
Reed, S.R., 2001. Duverger's law is working in Italy. Comparative Political Studies 34, 312–327.
Santucci, J.C., 2001. Les partis politiques marocains à l'épreuve du pouvoir. analyse diachronique et socio-politique d'un pluralisme sous contrôle. REMALD Collections Manuels et Travaux Universitaires.
Singer, M.M., Stephenson, L.B., 2009. The political context and Duverger's theory: evidence at the district level. Electoral Studies 28, 480–491.
Storm, L., 2007. Democratization in Morocco: the Political Elite and Struggles for Power in the Post-independence State. Routledge, New York.
Szmolka, I., 2010. Party system fragmentation in Morocco. The Journal of North African Studies 15, 13–37.
Taagepera, R., 1998. Effective magnitude and effective threshold. Electoral Studies 17, 393–404.
Taagepera, R., 2002. Nationwide threshold of representation. Electoral Studies 21, 383401.
Taagepera, R., Shugart, M.S., 1989. Seats and Votes: the Effects and Determinants of Electoral Systems. Yale University Press, New Haven.
Taagepera, R., Shugart, M.S., 1993. Predicting the number of parties: a quantitative model of Duverger's mechanical effect. American Political Science Review 87, 455–464.
Wegner, E., Pellicer, M., 2009. Morocco's local elections: with a little help from my friend. Cidob Notes Internacionals (3).
Wilcox, R.R., Erceg-Hurn, D.M., Clark, F., Carlson, M., 2013. Comparing two independent groups via the lower and upper quantiles. Journal of Statistical Computation and Simulation, 1–9.
Willis, M.J., 2002. Political parties in the Maghrib: ideology and identification. A suggested typology. The Journal of North African Studies 7, 1–28.

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