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DO WOMEN GAIN FROM CORRUPTION? AN ASSESSMENT OF THE
ELECTORAL IMPACTS OF BRAZIL'S AUDIT LOTTERIES

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Extended Abstract

It has become something of a cliché in the corruption literature to recount Przeworski et al's phrase: on learning that elected representatives have behaved corruptly, rational voters should "throw the rascals out". Put plainly, where politicians are democratically accountable, those who divert tax receipts away from the provision of public goods and services and towards private gain should lose the next election. Empirical work in this field has focused on establishing whether incumbents really are vertically sanctioned; often, they are. But substantially less attention has been paid to challengers' prospects. Moreover, theory concerning the causal processes that influence the kinds of challengers who fare better in elections after support for the incumbent has become unglued in this way is under-developed.

The logic of throwing out rascals implies that voters should aim to replace a rascal with someone who appears to be more honest-dealing—and that in this context as in others, due to rational ignorance, candidate stereotyping will have a role to play in voting behaviour. The gender literature consistently observes that women are assumed to be more honest than men, by both women and men alike. It has also been established experimentally that voters view female politicians as more honest than their male colleagues. Scholars have therefore speculated that women have gained in certain elections because of discontent with the shenanigans of 'traditional politicians'. To my knowledge, however, there has been no statistical evaluation of whether women receive an electoral boost in the wake of corruption scandals involving male incumbents.

This work does exactly that. It provides an analysis of the supply and success of female mayoral candidates where corruption has occurred under a male incumbent in Brazil's 5,570 municipalities, and over three electoral cycles. It finds that local media outlets play a pivotal role in these outcomes, as does the seriousness and extent of the incumbents' misdeeds, and the timing of the availability of knowledge about corrupt acts.

Where a municipal radio station is present to inform citizens about serious unscrupulousness that has occurred under the incumbent—or to inform them of violations that are large in extent but less serious in type—the supply of female candidates and of the votes that they win increases. The strength of this relationship predicted in the model is neatly symmetrical: close to the centre of the electoral

cycle, an audit report detailing low-level violations to the value of 10% of all audited funds should see an increase in the proportion of female candidates and in their votes of about 10%; where the value is 20%, these increases are also about 20%.

Importantly, this work also finds that the absence of local media outlets is associated with a reversal of this pattern. In municipalities without a radio or TV station, prospective female candidates are less willing to stand and do less well in elections than is otherwise the case after auditors have revealed less serious or incompletely proven corrupt acts by a male incumbent. As the next election draws near, up to the deadline by which one must register a mayoral candidacy, prospective female candidates are increasingly sensitive to this type of revelation. The interpretation put forward is that reports detailing less serious violations, such as uncompetitive bidding practices, serve as a signal of the networks that a mayor in that locality must engage in, in order to succeed in the job. Prospective female candidates are relatively unlikely to have an existing foothold in such networks, and therefore downgrade their own estimation of their ability to be a good mayor, and decide not to run. The closer to the candidacy registry deadline the report appears, the less time a prospective candidate has to set about establishing new contacts.

Work of this nature is intrinsically important to Brazil, where opinion surveys show that citizens care greatly about corruption. Even before the Lava Jato investigation, corruption was thought to reduce GDP by somewhere between 1.35% and 5%. Women's descriptive representation is also low in Brazil, despite policies engineered for the purpose of remedying the disparity. These policies include a widely flouted gender quota law that applies to the candidate lists in proportional representation elections. This research suggests that transparency initiatives can operate both synergistically with, and counter to, efforts to increase women's descriptive representation, according to the local media environment.

Keywords: gender, elections, representation, corruption, executive, media.

Literature Review and Theory

In response to learning about incumbents' corruption, voters do not always behave as though they seek a change in political representation. This has been shown, for example, in mayoral elections during the Spanish housing boom¹, and is evident from the successful re-election bids of individuals such as Silvio Berlusconi. However, in the case of Brazilian mayoral contests, various scholars²³ have reported that voters do indeed reject corrupt incumbents in response to critical audits by the Comptroller General's Office, or CGU (Controladoria-Geral da União, recently renamed the Ministério da Transparência, Fiscalização e Controle).

In constructing a theory about the kind of challengers who might benefit in such circumstances, a useful starting point is to characterize the elections and political office in question, irrespective of audit outcome. Mayoral elections in Brazil are relatively low information affairs in the sense that voters may know a little about the incumbent's biography and achievements as mayor, but voters' knowledge of some of his electoral challengers is often much more limited. The level of exposure may be as minimal as a face and a name on campaign posters⁴ or on the ballot⁵. Where the information they have to go on is limited, voters commonly employ heuristics, such as titles like 'doctor' or 'pastor'⁶, in place of more concrete knowledge of candidates' positions on specific issues. In other contexts, party labels serve as a similar informational cue⁷. But, in Brazil, parties tend to have wide and variable left-right issue spectra⁸, and party switching among politicians is rife⁹.

The office of mayor in Brazil can be characterized in general terms as follows. Executive dominance is the main political game in town; compared to the mayor, municipal legislatures are weak¹⁰. When it comes to government-paid jobs in the municipality, mayors do much of the hiring and firing¹¹. Mayors are largely responsible for executing a large range of public policies and for implementing public

¹ Fernandez-Vasquez et al. 2012

² Ferraz & Finan 2008

³ Brollo 2010

⁴ Gay 1999, p60

⁵ To accommodate illiterate voters, pictures of the candidates appear on the screens of the electronic voting machines that are used in Brazilian elections.

⁶ Boas 2014(a), p41

⁷ McDermott 1998, p896

⁸ Ames & Smith 2010, p3

⁹ Desposato 2006, p63

¹⁰ Samuels 2000, p80, in Kingstone & Power 2000.

¹¹ Ibid, p86

works¹². Many, in the words of David Samuels¹³, “continue to act as local ‘bosses’, transforming the rural coronel based on ownership of land to a ‘municipal coronel’ whose power is based on the personal ‘ownership’ of municipal government”. ‘Owning’ the municipal government furnishes mayors with a lot of power, for municipalities in Brazil have a degree of autonomy far exceeding that of municipalities in any other Latin American country, and this autonomy is enshrined in the 1988 constitution¹⁴.

One piece of information that voters can usually pick up from merely a first name is a candidate’s sex. Voting is compulsory for literate citizens between 18 and 70 years of age in Brazil¹⁵, so even the most politically disinterested must decide on a preferred candidate¹⁶ and will be exposed to this data. Under normal circumstances, when there has been no recent CGU audit, female mayoral candidates should do poorly if their sex is used as a heuristic to guide voting decisions¹⁷. This is because the suite of characteristics that voters perceive as necessary for any candidate to successfully fulfill the job of mayor is likely to be very different to the suite of characteristics they associate with women. This line of argument draws on social role theory¹⁸. This literature casts men as assertive, controlling and confident, and ascribes to women more communal than agentic strengths, such as concern for others’ welfare¹⁹. Classic, male descriptive norms are therefore highly congruent with what voters are likely to perceive as necessary attributes of a Brazilian mayor; female descriptive norms are not.

Sex stereotypes are automatically activated in many professional and political contexts²⁰, including when people are asked to assess others’ potential in different jobs. A meta-analysis of 49 publications of Goldberg-Paradigm experiments, in which participants evaluate men and women whose characteristics have been equated, found that men are consistently preferred over women²¹ for jobs rated as male sex-typed (by participants of both sexes)²². The idea that prejudice toward female leaders

¹² *ibid* p86

¹³ *ibid*, p80

¹⁴ Nunes 1995, 196

¹⁵ Power 2009, 98

¹⁶ Unless they spoil their ballot.

¹⁷ Indeed women do very badly in mayoral elections compared to elections for other types of political office in Brazil. Fleischer 2008

¹⁸ Eagly & Karau 2002, p573

¹⁹ Eagly & Karau 2002, p574

²⁰ Greenwald et al 2009, p24

²¹ Davidson & Burke 2000

²² Conversely, women are preferred over men for jobs considered female sex-typed.

flows from a perceived incongruity between the characteristics of women and the requirements of being a leader is supported replications of work originally carried out by Schein²³. Schein documented a masculine construal of leadership, finding that U.S. citizens have dissimilar beliefs about leaders and women, and similar beliefs about leaders and men. Schein's work and results have been replicated in many other countries, among them Germany, China, Japan²⁴ and Singapore²⁵.

In this paper I suggest that the male sex-typing of a position may be weakened when assessors—in this case, voters—place greater emphasis on the need for the role holder to abstain from corrupt acts. The prominence of the female descriptive stereotype of honest-dealing is discussed with robust consistency in the gender literature. McDermott states²⁶ that female candidates are viewed as more dedicated to honest government, and while the stereotypes that voters hold about female candidates are numerous and varied, maintaining an honest and ethical government is one of a “core few which turn up on almost all analyses on the subject”²⁷. Similar assertions are made by Huddy and Terkildsen²⁸, in their evaluation of gender stereotypes at different levels and type of political office. Williams and Best²⁹ demonstrate that some sex stereotypes are ‘pan-cultural’. In a survey of the degree of similarity in the attributes ascribed to men and women that recorded data on the honest-dealing stereotype in 25 countries, they find Brazil to be a typical country in terms of its summed sex stereotyping scores across attributes³⁰, and also in terms of its sex stereotyping of ‘honesty’³¹.

Thus, in the Brazilian municipal context, if voters respond to new knowledge of incumbent mayors' corruption by punishing these mayors at the ballot box, it follows that they should also be sensitive to signals of probity from among the incumbent's challengers. The stereotypical suite of characteristics required to be a successful mayor would, in such situations, be updated in voters' minds; ‘honest-dealing’ would be added to it. Because ‘honest-dealing’ is a female descriptive norm³², the

²³ Schein 1973

²⁴ Schein 2001, p675

²⁵ Lee & Hoon 1993, p415

²⁶ McDermott 1998, p895

²⁷ Ibid, p900

²⁸ Huddy & Terkildsen 1993, p503

²⁹ Williams & Best 1982, Chapter 10; Williams & Best 1999, p513

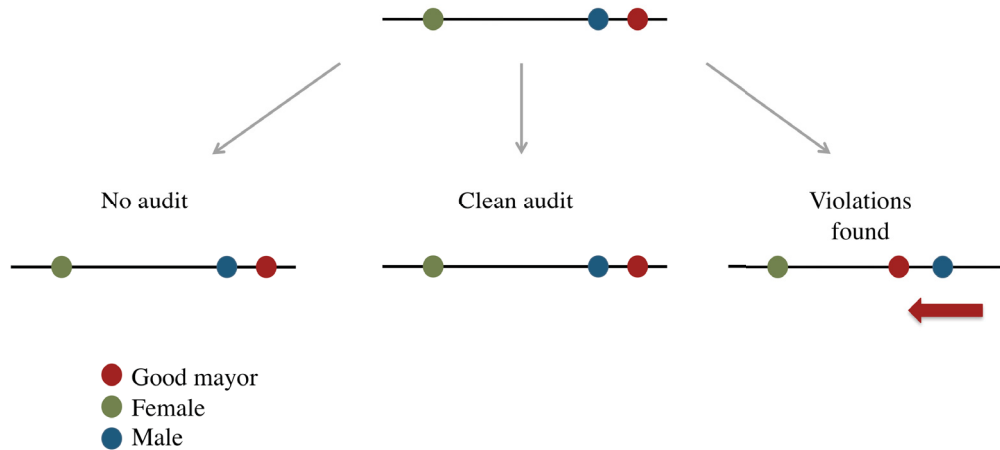
³⁰ Williams & Best 1982, p254

³¹ Ibid, p314

³² Cialdini & Trost 1998, Chapter 21, in Gilbert et al 1998.

incongruity between how voters now stereotype a successful mayor and how they stereotype women should shrink (Figure 1)³³.

Figure 1



A schematic of changes in the sex-typing of the role of mayor in response to information about incumbents' corruption. The red dot on each line represents the midpoint of the suite of characteristics that voters perceive as necessary for the successful fulfillment of the office of mayor. The horizontal black lines represent a continuum of characteristics ordered from most female-type (on the left), to most male-type (on the right). The green and blue dots are the midpoints of the stereotypes of 'a typical woman' and 'a typical man' in a municipality. Note that on three of the lines, the 'good mayor' stereotype is slightly more male than a typical man. But where violations are found, the red dot moves from its original position because the midpoint of the 'good mayor' stereotype now takes in the female-type characteristic, 'honest-dealing'.

The theory put forward therefore predicts that the proportion of votes for female mayoral candidates will increase where a CGU report has revealed violations that occurred under a male incumbent mayor who is seeking re-election (Hypothesis 1). Because prospective female candidates are likely to have their fingers on the pulse of public opinion, their anticipation of this electoral boost should encourage them to run in the next election. Therefore, in response to voters learning about corruption under a male incumbent who is seeking re-election, the supply of actual female candidates from the existing pool of prospective female candidates should also

³³ This theory does not directly address how voters respond to learning that a female incumbent mayor is corrupt. Extending social role theory in this context would predict even greater punishment of a corrupt female incumbent than a corrupt male incumbent, all things being equal, because voters would draw upon injunctive as opposed to descriptive norms. Ibid.

increase³⁴ (Hypothesis 2). This can be formalized as an increase in the proportion mayoral candidates who are female, controlling for the size of the pool of prospective female candidates. In the analyses that follow, the influence of local media is explored as an indicator of the extent of voters' knowledge of the contents of auditors' reports. The freshness of corruption revelations is also considered by looking at when over course of an electoral cycle the reports are published. I anticipated stronger confirmation of my two hypotheses where local media outlets are present to disseminate auditors' findings, and when such findings were revealed close to the date of the next election (for Hypothesis 1), or close to the date by which individuals must register mayoral candidacy (for Hypothesis 2).

Method

The statistical analysis in this paper leverages independent assessments of local government corruption from the CGU's lottery program. This began in 2003, and has since randomly selected 2,144 of Brazil's 5,570 municipalities for audit on at least one occasion. Coded audit report outcomes were included in a database constructed specifically for this research, alongside voting data and many demographic variables and additional information about Brazilian municipalities. A list of data sources can be found in the Appendix³⁵.

i) The corruption data

Figure 2 shows the occurrence of CGU lotteries since the program began. After each lottery, mayors of selected municipalities received a letter stating that their municipality had been picked, and that auditors would arrive imminently³⁶. The CGU took approximately one week to prepare for the auditing process—an undertaking that required gathering details dating back to 2001, and in a minority of cases, to 1997, of the fiscal transfers from all federal government departments to all of the selected municipalities. Both constitutionally mandatory transfers and discretionary, politically negotiated transfers are included in the audits. Together, these represent the lion's share of municipal budgets, even in cases where local administrations raise

³⁴ There is a large literature about upstream influences on the size of this pool; the theory put forward here assumes constant female prospective candidate-pool size per municipality over the course of an electoral cycle.

³⁵ A series of balance tests to evaluate the randomness of the CGU's selection process were also performed; results are available from the author on request.

³⁶ Ibid.

money from service taxes, fines and residential property taxes³⁷. By the end of the preparation week, the CGU generated service orders stipulating specific audit tasks³⁸ for its representatives who will travel to the field.

A small army of auditors—perhaps 600 in total, or about 10 for each audit to be conducted—then immediately descended on the selected municipalities, where they would spend a fortnight gathering information about how federal funds have been disbursed in practice. Each team of auditors included a supervisor³⁹, and team members were usually drawn from those stationed in the CGU office in the municipality's state capital, rather than from a different state or the CGU's head office in Brasília (although there is some travel to make up numbers)⁴⁰. Importantly for the analyses in this paper, CGU auditors followed the same procedures in all lottery-selected municipalities⁴¹ as stipulated in service orders generated in Brasília, so the rigor and depth of the audit process should have been consistent across time and space. If the complexity of a municipality's finances suggested that an audit would be unusually demanding, the CGU increased the audit team size as opposed to extending the audit period⁴². The week between lottery selection and the commencement of the audits offered little opportunity for corrupt mayors to rewrite cooked books⁴³ because CGU auditors arrived carrying all the documentation required for a full audit, and set about quarrying for information in the municipality's hospitals and other public locations, as opposed to relying on the municipal administration's records.

A month or two after returning from the field, the CGU would send a preliminary report to the municipal administration, outlining all of the problems that its auditors uncovered. This version of the report came with a deadline, 10 days hence⁴⁴, before which the violations described in it had to be justified if they were to be re-considered in the final report. Sometimes local administrations' explanations were accepted; other times they were rejected⁴⁵. When the final report was ready, approximately

³⁷ Brollo 2010, p7

³⁸ Ferraz & Finan 2008, p707

³⁹ Ibid, p709

⁴⁰ Zamboni pers comm., 2 February 2015

⁴¹ Ibid, 18 August 2014

⁴² Ibid.

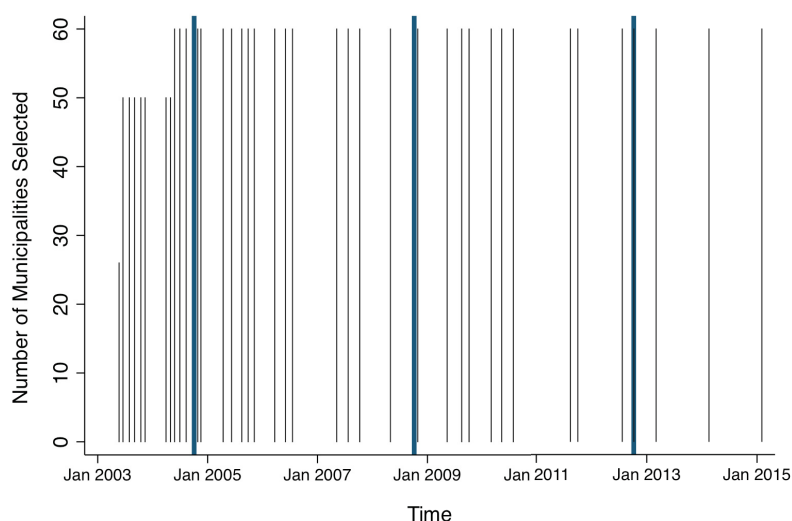
⁴³ In the case of the municipality of São Francisco do Conde, in Bahia, thieves even broke into a city council's building shortly after the municipality was selected in lottery 6, and stole cell phones, diskettes and documents relating to the activities of two ex-mayors already suspected of misappropriation of public funds. Agencia Nordeste, 21 October 2003.

⁴⁴ Castro 2011

⁴⁵ Marques 2005

three months after a municipality was selected in a lottery⁴⁶, it was published on the CGU's searchable website⁴⁷ and sent to government departments and agencies that manage federal transfers within their respective purviews. Where serious wrongdoings were discovered, some federal transfers were temporarily halted⁴⁸, and the audit report was occasionally sent to the federal police, the Attorney General, the state's Public Prosecutor, and the Court of Accounts (Tribunal de Contas da União).

Figure 2



Lottery selections to the end of 2012. The blue lines indicate the occurrence of municipal elections in October 2004, 2008 and 2012.

Audit reports from the second to the 29th lotteries, inclusive, (May 2003 to August 2009) were previously coded by Fernanda Brollo, of the University of Warwick, and made available on her website⁴⁹. As described in Brollo et al (2013), this dataset contains binary scores for each report for the categories 'broad' and 'narrow'. Brollo codes a report as 'broad' if it describes violations that are not clear cases of fraud; she codes a report as 'narrow' if it describes more serious violations that could not be interpreted as poor management. Using this system, a report can be coded as both broad and narrow—indeed, if a report is 'narrow' it is logically always also 'broad'. For the analyses in this paper, I recoded these categories using the logic that a report's corruption category should describe the upper limit of the violations it

⁴⁶ Zamboni pers comm., 18 August 2014

⁴⁷ All of the audit reports can be downloaded here: <http://sistemas.cgu.gov.br/relats/relatorios.php>

⁴⁸ Brollo 2010, p8-9

⁴⁹ <https://sites.google.com/site/fernandabrollo/home/data>

contains, which I considered more relevant to a theory about situations that voters decide what they will put up with from an incumbent's administration. I therefore use the term 'strong' identically to Brollo's use of 'narrow'. However, what I term 'weak' has a slightly different definition to Brollo's 'broad'. Audit reports in the weak category never contain strong violations; 'weak' and 'strong' are mutually exclusive categories.

ii) The estimation approach

The dependent variables predicted in this paper are: 1) the change in the proportion of votes received by female mayoral candidates in each municipality (to reflect Hypothesis 1), and 2) the change in the proportion of mayoral candidates who are female in each municipality (to reflect hypothesis 2). In both cases, 'change' refers to the difference between the election that followed a CGU audit and the one that preceded it. These electoral cycles were either 2000-4, 2004-8, or 2008-12, depending on the municipality. Data from all three electoral cycles were pooled in creating the DVs⁵⁰, and dummy variables for them were included in models to account for secular trends. The analyses were also restricted to municipalities that are also subject to the CGU lotteries, to municipalities in which no run-off mayoral election can occur (both based on municipal population⁵¹), and to cases where an incumbent male mayor was seeking re-election in the election that followed a CGU audit⁵².

Even though balance tests confirmed that the selection of municipalities for audit was indeed fully random, an intention-to-treat analysis was rejected in favour of linear regression. This was because the logic of intention-to-treat would have considered municipalities in which information about corruption that has occurred under the incumbent mayor as the treatment. Consequently, 'never treats'—units that always experience the control condition—would have included both audited municipalities in which no corruption was found by CGU auditors (henceforth referred to as 'clean'), and municipalities that had received no audit. Yet there is evidence to suggest the

⁵⁰ Repeat audits, where a municipality was selected for a second or third time in the lotteries, were not included in the analyses.

⁵¹ Municipalities were excluded from the lottery program if their population exceeded a threshold. Approximately one year into the program, from the 9th lottery onwards, this population ceiling was raised from 300,000 to 500,000. State capitals are also exempt. Run-off mayoral elections are triggered when a municipality's voting population rises above 200,000.

⁵² Mayors in Brazil cannot serve for more than two consecutive terms.

assumption of equivalence between these two categories would be erroneous⁵³. Regression analysis was therefore chosen because it allowed for estimation of the DVs using a categorical variable for the audit outcomes clean, weak, strong, as well as 'unaudited'. The initial analyses⁵⁴ that did not take into the account the timing of CGU audits were first run using 'unaudited' as the reference category, and then re-run focusing only on the audited municipalities, employing 'clean' as the reference category.

Typically, in the case a hugely diverse country like Brazil, over a period that witnessed substantial change in many indicators, taking account of the nested structure of data through the use of hierarchical modeling would provide an important correction to the standard errors of coefficients of interest. However, the potential for committing ecological fallacy was in these analyses reduced by the use of dependent variables, and predictors of them, that are calculations of electoral cycle-changes that have occurred within municipalities⁵⁵. Thus, the between-municipality component—or random-effects component—of hierarchical models should be far less pertinent than would be the case were the variables of interest static measures. This was verified using a Hausman specification test using an identifier for individual municipalities as the subject identifier. Even though the difference in the coefficients calculated by fixed and random models for one variable, the change in municipal HDI, was quite large, the overall test was highly significant ($p < 0.001$), implying that the random intercept model should be abandoned in favour of OLS regression⁵⁶.

After initial OLS analyses, an interaction term called 'bad timing' was introduced to the OLS models to take into account the timing of CGU audits with respect to the next mayoral election. 'Bad timing' is the product of an audit outcome variable and the timing variable, 'months', which takes on values from 1 to 48. 'Months' is simply the number of completed months between lottery selection and the last municipal election. Ideally, the timing variable would refer not to when the relevant lottery was held, but to the date of release of individual audit reports. However, no such information was available. Adjustments in the interpretation of the results were

⁵³ Ferraz and Finan's original evaluation of the lottery program found no significant effect for CGU reports containing just one violation on the odds of incumbents' re-election, leaving open the possibility that Brazilian voters do not expect their mayor to be completely clean. If very occasional irregularities are expected, then none may be a surprise.

⁵⁴ Due to lack of space, these analyses are not shown in this paper.

⁵⁵ The variables 'the change in municipal HDI over the electoral cycle', and 'the change in the proportion of female voters over the same period'—take on values between -1 and +1, like the DVs. The other controls (except the categorical audit outcomes) are straightforward proportions.

⁵⁶ Rabe-Hesketh & Skrondal 2012, p158

instead made using the statement that audit reports are typically released three months after a municipality was selected in a lottery⁵⁷. All analyses using the ‘bad timing’ interaction did not include unaudited control municipalities, given the self-evident fact that these units have no ‘months’ variable value. The clean audit group therefore always served as the reference category for the weak and strong violations groups.

iii) The four models

OLS regressions were conducted to predict both DVs, by sequentially constructing the following four models. Model 1 tests the significance of the audit report contents in isolation from other variables that theory suggest may impact the dependent variable. The approach with each of the subsequent models is to sequentially add potential predictors of the dependent variable, which may also impact the significance of the audit variable. For example, the proportion of sitting, elected, female city councillors is likely to influence the dependent variable by reflecting the size of the pool of prospective female mayoral candidates. Yet, having a city council composed largely of elected female council members may also act as a check on the violations that occur under the mayor if female councillors view the acceptance of bribes more critically⁵⁸ than male council members. In this scenario, adding this control variable could reveal spuriousness in any impact of the audit reports that is suggested in Model 1.

Model 2 controls for the size of the challenge that the incumbent presents to challengers of all types. The two variables it adds are the incumbent’s margin of victory over the runner up candidate in the previous election, as a proportion of all votes cast, and the change in municipal HDI over the electoral cycle, which provides an indicator of how much citizens’ lives have improved (or deteriorated) under the incumbent.

Model 3 seeks to account for the size of the pool of prospective female mayoral candidates using as an indicator, the proportion city councilors who are female and were elected in the last election⁵⁹—an indicator that may warrant some criticism. This

⁵⁷ Zamboni, pers. comm., 10 February 2015

⁵⁸ Swamy et al 2001, p25

⁵⁹ The elections for city council members employ a proportional representation system. In this variable I therefore specifically only count those female city councillors who earned their seats by attracting votes

is because many elected city council members harbour no desire to become mayor; prospective mayoral candidates need not have prior experience on the city council; and, due to the proportional representation electoral system that elects council members, councillors who develop ambitions for executive office may owe their current seats to votes won by copartisans. However, in the absence of a direct, aggregate measure of all upstream contributors to the size of the pool of prospective female candidates, this indicator is likely to reflect the fraction of women in a municipality who pay close attention to municipal politics and who can be confident of having a non-negligible constituency of support from which to build upon.

Model 4 holds constant progressiveness, or the extent of liberal values among the electorate, both in a broad sense and specifically in regard to the salience of traditional gender roles and gender-associated competencies. Because there has always been a substantial skew towards men⁶⁰ in the sex ratio of Brazilian mayors, the progressiveness of the local electorate is likely to weigh heavily on the minds of prospective female candidates as they consider how receptive voters will be to their candidacies. Overall, women hold surprisingly more liberal⁶¹ political opinions than men in Brazil. Even so, one can hypothesize that the direction and size of this gap is conditional upon the local level of HDI, in line with cross-national patterns in the effects of industrialization. Holding all other features of a municipality constant, one would expect that where HDI is among the lowest levels found in Brazil, women are more conservative than men in both classic left-right issue cleavages⁶² (such as how far the government should go in providing a welfare state), and in adhering to the ideological stance that traditional gender roles should be maintained⁶³. Where HDI is high, however, women will hold more left-wing values than men and more feminist opinions⁶⁴, taking feminism to mean a willingness to challenge the historical insertion of women in society. Due to the conditional nature of this relationship,

Model 4 includes an interaction term, the product of the estimated municipal HDI for year at the end of the electoral cycle and the proportion of voters who are female in

themselves, rather than those that owe their positions to votes won by others in their party. The TSE raw data includes this information.

⁶⁰ Rangel 2012, p3-4

⁶¹ Inglehart and Norris 2003, p82. In Inglehart and Norris's dataset, the gap between male and female voters' views on the role of government (1990 to 2001) is greater in Brazil than in almost all of the rest of the world. Only in two countries are women even more left wing compared to men from the same nation—Uganda and Ghana—than is the case in Brazil.

⁶² Ibid, p81

⁶³ Ibid, p81

⁶⁴ Ibid, p81

the same year. The latter can vary as much as 7% over the course of a single electoral cycle, and as such, I account for any potential effects that may arise from it by including a separate proportional change variable.

Results

OLS regressions that included all audited municipalities to lottery 29 revealed significant coefficients at odds with my hypotheses for the first half of the electoral cycle. In the first half, lottery selection that results in a report of weak violations is associated with a highly significant ($p < 0.01$) *reduction* in both the proportion of votes for females and in the proportion of candidates who were female. However, this overall result appears to be the outcome of the vast majority of CGU-audited Brazilian municipalities having no broadcast media outlets, since only that subset of the data echoes these patterns. The presence a local radio station is capable of reversing the reductions for both DVs. As per both of my hypotheses, municipalities with their own radio station in which CGU auditors found evidence of strong violations saw an increase in both the demand for female candidates (as measured by the change in the proportion of votes for them), and in their supply (as measured by the change in the proportion of candidates who were female).

i) Analysis of all audited municipalities

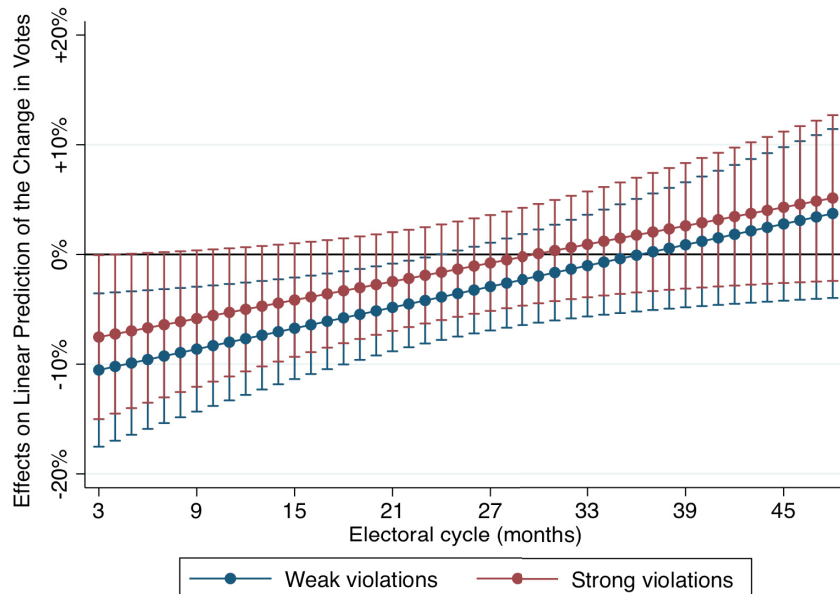
The coefficient values and significance levels of both weak and strong versions of the bad timing term hardly fluctuate between models in Tables 1 and 2. The subsequent marginal effects graphs—Figures 3 and 4—show that the blunt fact of a report of weak violations under a male incumbent is associated with a decrease in both the proportion of votes for women and the proportion of female candidates when it occurs early in the electoral cycle. As the months pass, so does the apparent effect size in each case. For example, if lottery selection occurred six months in, and leads to a report detailing weak violations, Model 4 in Figure 4 predicts a 11.4% (S.E. = 4.4%) decrease in the proportion of female candidates from one mayoral election to the next, relative to municipalities with a clean report that were selected at the same time. But if selection occurred halfway into the electoral cycle, the equivalent predicted reduction is much less: 6.1% (S.E. = 2.5%). By 26 months in, there is no longer a statistically significant difference between municipalities that receive reports containing weak violations versus those with clean reports.

Table 1

| Explanatory variable | (1) | (2) | (3) | (4) |
|---|------------|------------|------------|------------|
| Weak | -0.1094*** | -0.1129*** | -0.1126*** | -0.1148*** |
| Strong | -0.0749* | -0.0725* | -0.0789* | -0.0838** |
| Months | -0.0020* | -0.0023* | -0.0022* | -0.0021* |
| Bad timing, weak | 0.0029** | 0.0032** | 0.0031** | 0.0032** |
| Bad timing, strong | 0.0024* | 0.0025* | 0.0027* | 0.0028** |
| Incumbent dominance | --- | 0.0569 | 0.0507 | 0.0496 |
| Change in HDI | --- | -1.1801* | -1.1272* | -1.8548** |
| Elected female city councillors | --- | --- | 0.0977* | 0.1013* |
| Change in the proportion of female voters | --- | --- | --- | 0.4558 |
| HDI (a) | --- | --- | --- | 1.4370 |
| Proportion of female voters (b) | --- | --- | --- | 1.7025 |
| Progressiveness (a)*(b) | --- | --- | --- | -3.3754 |
| Adjusted R ² | 0.0242 | 0.0295 | 0.0332 | 0.0330 |
| N | 539 | 539 | 539 | 539 |

Predicted change in the proportion of votes for female candidates, using a categorical audit outcome variable in bad timing interactions; the years 2000 to 2012 are combined. The cells display the coefficients of independent variables with corresponding significance levels: $p < 0.1 = *$; $p < 0.05 = **$; $p < 0.01 = ***$. All models include dummies for electoral cycles and lottery randomization blocks, not shown. The clean audit group serves as the reference category for the other audit outcomes. The significance of the progressiveness interaction was plotted across values of HDI; no significance was observed.

Figure 3



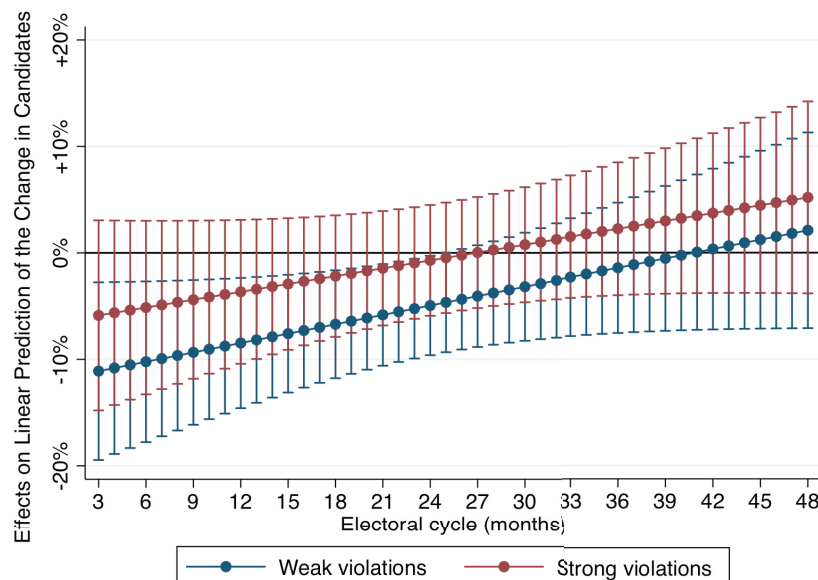
Average marginal effects of the categorical audit outcome variable's bad timing interactions. Plotted using the bad timing interaction in Model 4. The full Y-axis title, which there was not space for, should be 'Effects on the Linear Prediction of the Change in the Proportion of Votes for Female Candidates'. 95% confidence intervals of the marginal effects are shown.

Table 2

| Explanatory variable | (1) | (2) | (3) | (4) |
|---|-----------|-----------|-----------|-----------|
| Weak | -0.1181** | -0.1203** | -0.1202** | -0.1198** |
| Strong | -0.0603 | -0.0593 | -0.0633 | -0.0661 |
| Months | -0.0014 | -0.0015 | -0.0015 | -0.0014 |
| Bad timing, weak | 0.0030* | 0.0031* | 0.0030* | 0.0029* |
| Bad timing, strong | 0.0023 | 0.0023 | 0.0024 | 0.0025 |
| Incumbent dominance | --- | -0.0002 | -0.0042 | -0.0100 |
| Change in HDI | --- | -0.8830 | -0.8491 | -1.1102 |
| Elected female city councillors | --- | --- | 0.0626 | 0.0671 |
| Change in the proportion of female voters | --- | --- | --- | 0.8235 |
| HDI (a) | --- | --- | --- | 2.1709 |
| Proportion of female voters (b) | --- | --- | --- | 2.7709 |
| Progressiveness (a)*(b) | --- | --- | --- | - |
| | | | | 4.5706 |
| Adjusted R ² | 0.0071 | 0.0056 | 0.0053 | 0.0001 |
| N | 539 | 539 | 539 | 539 |

Predicted change in the proportion of female candidates, using a categorical audit outcome variable in bad timing interactions; the years 2000 to 2012 are combined. The cells display the coefficients of independent variables with corresponding significance levels: $p < 0.1 = *$; $p < 0.05 = **$; $p < 0.01 = ***$. All models include dummies for electoral cycles and lottery randomization blocks, not shown. The clean audit group serves as the reference category for the other audit outcomes. The significance of the progressiveness interaction was plotted across values of HDI; no significance was observed.

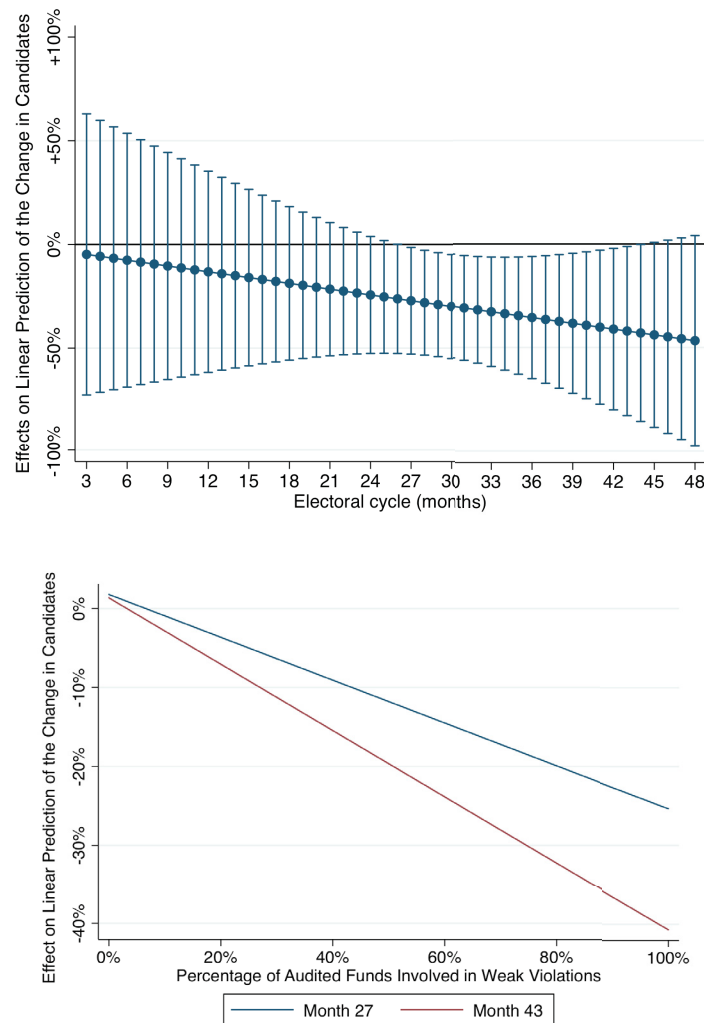
Figure 4



Average marginal effects of the categorical audit outcome variable's bad timing interactions; the years 2000 to 2012 are combined. Plotted using the bad timing interaction in Model 4. The full Y-axis title, for which there was not space, should be 'Effects on the Linear Prediction of the Change in the Proportion of Female Candidates'. 95% confidence intervals of the marginal effects are shown.

In the case of the supply of female candidates, rerunning the models using bad timing variables that do not interact ‘months’ with categorical variables, but instead interact it with continuous measures of the proportion of audited funds that can be categorized as ‘weak’ or ‘strong’ violations, adds to the story. In the point of the electoral cycle when revelations of the blunt fact of weak violations under the incumbent becomes no longer significant, the amounts involved start to matter—until the approximate deadline for candidacy registration, in June of the electoral year⁶⁵.

Figure 5



Above: The average marginal effects of bad timing interactions using the linear proportion of audited funds involved in weak violations. Below: The predicted effect of this proportion on the dependent variable, for months that are early and late in the period for which the association is statistically significant. Plotted using coefficients from Model 4 (full results not shown lack of space; the coefficients are similar to those in Table 2), and average values for all other variables.

⁶⁵ This pattern was not found in analogous analyses of the change in votes received by female candidates, which makes sense if one expects voters to be less aware of the details of possible violations. For prospective candidates assessing their own abilities to perform well in the role of mayor, however, the extent to which—if they were to get the job—they may feel pressured to engage with networks of individuals who facilitate low-level corruption could be very salient information.

ii) The influence of local media

For ease of interpretation, instead of running three-way interactions between an audit outcome variable, months, and a media variable, the bad timing models for which results have already been presented using the full dataset, were rerun using subsets of it according to the type of broadcast media outlets locally present⁶⁶. When the models are run on the subset with neither a local TV station nor a local radio station, the results are essentially the same as those for the full dataset. However, as Figures 6 and 7 show, municipalities with their own radio outlets have outcomes in line with Hypotheses 1 and 2⁶⁷.

Revelations that strong violations have occurred under the male incumbent significantly increase the proportion of women running for mayoral office, only when they appear during the period that prospective candidates one would expect to be forming a final decision about whether to run against the incumbent (Figure 6, upper graph)⁶⁸. Although there is no accompanying, significant increase in votes for women when strong violations appear late in the electoral cycle, the trend follows that direction (Figure 6, lower graph). Moreover, in this media environment, weak violations, whilst not significant as a blunt fact (Figure 6), matter in their proportion (Figure 7, lower graph). When the bad timing interactions using the continuous audit variables are run, the greater the linear proportion of weak violations, the stronger the increase in both dependent variables—when audit reports are released in the middle portion of the electoral cycle (Figure 7, lower graph). On this point it is worth noting that significance results from a pinching in of the confidence intervals rather than a change in the slope of the margins plot line. As such it may be driven not by time per se, but by the fact that the proportion of weak violations tends to be high in audit reports that were published in the middle of the electoral cycle compared to reports that were published at the beginning or the end of the electoral cycle.

Figure 8 elaborates the results shown in Figure 7, by plotting the association between the linear proportion of weak violations and both DVs, in month 27. The two DVs are plotted together to draw attention to how similar they are, even though some of the coefficients in the models used to create them are quite different. The apparent

⁶⁶ Recall the final model includes a control for municipal HDI.

⁶⁷ Because it is rare for a municipality to have a TV station without also having a radio station, and there are relatively few municipalities with their own TV broadcast outlet, TV was not analyzed further.

⁶⁸ Essentially the same result was found when the model was run on municipalities with a radio station, as opposed to those with a radio station *and* no TV station.

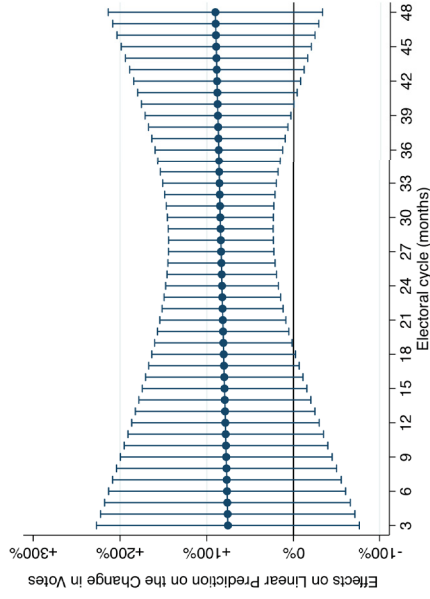
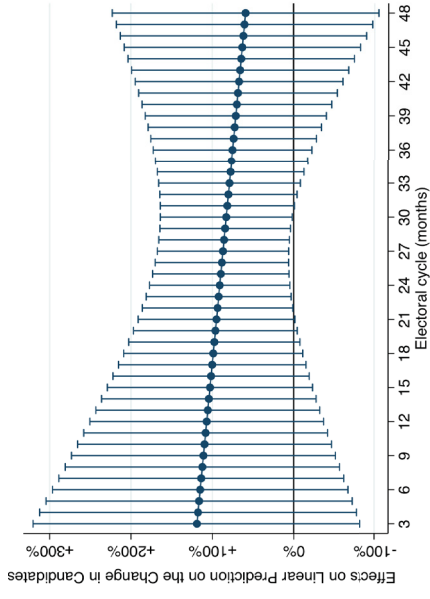


Figure 7. The bad timing interactions using the linear proportion of audited funds involved in weak violations, and data from municipalities where a radio station is the only local broadcaster. Above: DV = the change in the proportion of female candidates. Below: DV = the change in the proportion of votes for female candidates. Plotted using coefficients from Model 4 (N=78). 95% confidence intervals of the marginal effects are shown.

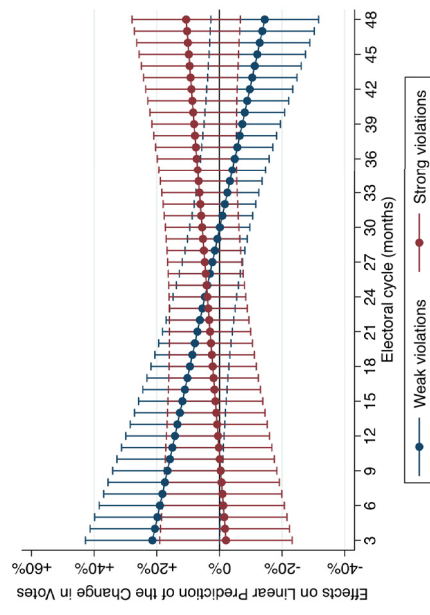
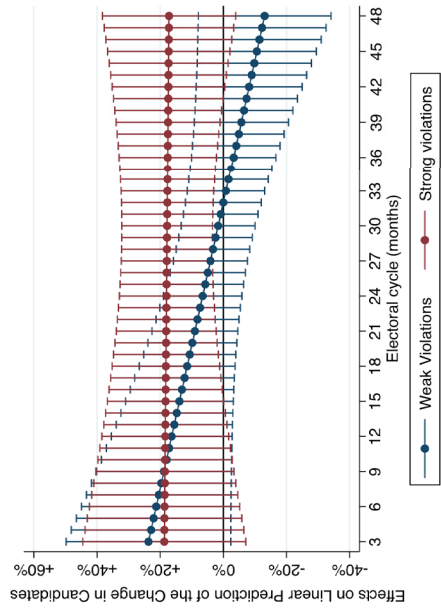
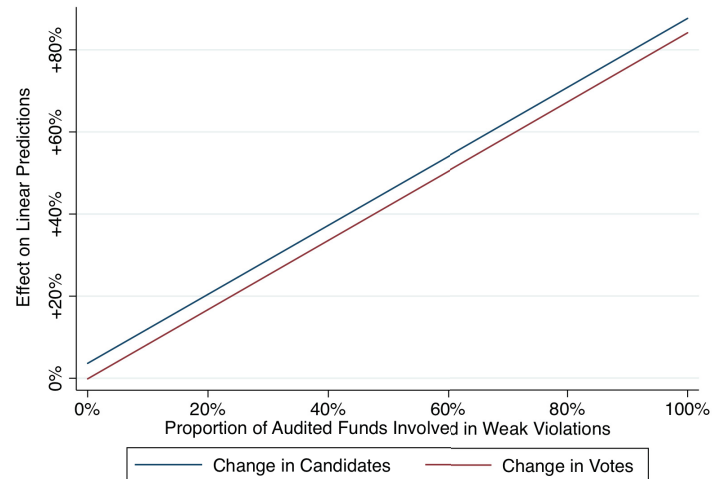


Figure 6. The bad timing interactions of audit outcome categories when the model is run using data from municipalities where a radio station is the only local broadcaster. Above: DV = the change in the proportion of female candidates. Below: DV = the change in the proportion of votes for female candidates. Plotted using coefficients from Model 4 (N=93). 95% confidence intervals of the marginal effects are shown.

effect in month 27 is this: where violations that make up 10% of all audited funds, the model predicts an increase in the proportion of female candidates and in their votes of approximately 10%; where the value is 20%, these increases are about 20%.

Figure 8



A plot of the predicted effect of the linear proportion of weak violations on both dependent variables, in month 27, using coefficients from Model 4 (N=78). The graph was plotted using average values for all other variables. Substantively relevant values are on the left-hand side of the graph, since the X axis-variable is rarely recorded at values above 50%.

Conclusion

This paper evaluated two hypotheses that were borne of a marriage of the gender literature with the corruption and voting literature. To the gender literature, it provides the only quantitative evaluation based on actual voting data, of the postulated advantage of the female ‘honest-dealing’ stereotype. To the corruption and voting literature, it adds to work that emphasizes distinguishing types of corruption¹, and to a recent emphasis on challengers’ post-scandal prospects².

It also suggests a crucial relevance of local broadcast outlets for the outcomes explored. The effect of local news was originally conceived merely as a means to disseminate auditors’ findings to a greater proportion of voters—and, as such, it was expected to amplify increases in both the success and supply of female mayoral

¹ Cuervo-Cazurra 2008

² Chong et al 2011

candidates. Instead, the results indicate that such increases are in fact *contingent* on the presence of local radio. If an audit report is released during the window when prospective candidates are likely to be deciding whether to run for mayoral office, in a municipality with a local radio station, the revelation that a definite case of corruption has occurred under a male, incumbent mayor does appear to encourage women to stand (Hypothesis 2). Meanwhile, less serious violations matter in the same context in their degree; during a window of sensitivity, the greater the proportion of federal transfers that have been involved in such dealings under the incumbent, the more women appear to be motivated to run for mayoral office. And the votes women receive as a group match their more common presence (Hypothesis 1). The strength of these relationships appears to be neatly symmetrical, with the change in the proportion of audited funds associated with weak violation approximately equal to the changes seen in both DVs, for audit reports released in the middle of the electoral cycle in municipalities with a radio station (Figure 8).

That the results also showed decreases in the two dependent variables in municipalities where weak violations were reported and which lack any local broadcast media was not expected. Several mechanisms could be at play. One may be that elites are much more likely than the masses to learn of auditors' findings where there is no local media to disseminate them, perhaps because they have more to gain from finding and reading the reports themselves, or because they may be better educated and more able to read them, or because elites may be likely to move in social circles that include individuals who have read them. In this view, municipalities with a radio station can be characterized as those in which voters generally know if the CGU has found the mayor to be corrupt, whereas voters in municipalities with no local broadcaster generally do not learn this. Prospective female candidates in no-media contexts may lower their expectations for how well they would perform as mayor, because, as elites, they would know of a report's contents, but they would also be less likely than the average prospective male candidate to have established relationships with local companies described in the report. The auditors' report would lead to them updating their priors about how power is really managed behind the scenes, and, in light of this, they may deem themselves less qualified for the position of mayor, or less likely to be successful in it. This explanation remains speculation, and would benefit from detailed case study work.

Future work in this area would benefit from careful examination of potentially relevant omitted variables, such as ownership of local media outlets and the choice of running mate. (Mayors in Brazil campaign with a deputy, who unfortunately is not linked to them in electoral data.) Separately, it is a concern that the publication of campaign finance data across years by the electoral courts has been uneven, which prevented the calculation of a variable for the change in the proportion of campaign finance spent by female candidates.

Acknowledgements

This work would not have been possible without the generous provision of laboriously coded corruption data from Fernanda Brollo, or the University of Warwick, nor without the excellent supervision of Timothy Power, of Oxford University. I am hugely grateful to them both.

Appendix

Data sources table.

| Source | Data |
|--|---|
| Tribunal Superior Eleitoral http://www.tse.jus.br/eleicoes/eleicoes-antiores/eleicoes-antiores | Vote scores; candidate demographic data, such as sex and age; candidate party data; electorate demographic data, such as the proportion of female voters. |
| Fernanda Brollo https://sites.google.com/site/fernandabrollo/home/data | All audit outcome data. |
| IBGE's Perfil dos Municípios Brasileiros: Gestão Pública http://www.ibge.gov.br/home/estatistica/pesquisas/pesquisa_resultados.php?id_pesquisa=89 | Local AM radio station and local TV station data. |
| Brazilian Census http://www.atlasbrasil.org.br/2013/en/ | Municipal-level HDI. (These data were available for the years 2000 and 2010 only. Therefore all intervening years were interpolated linearly, and figures for 2011 and 2012 were calculated by extrapolating that trend.) |
| Brazilian Treasury http://www3.tesouro.fazenda.gov.br/estados_municipios/ | Municipal-level public spending on infrastructure and services. |

Bibliography

Not included for lack of space. Available to download at www.annapetherick.com