



Research article

The local economy and re-election of incumbent district leaders in Indonesia

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ABSTRACT

This paper tests whether economic growth and unemployment rates matter in the re-election of incumbent district leaders in Indonesia. Applying the Probit and Heckprobit model on Indonesia's local direct elections during 2005–2013, we find that both unemployment and GDP per capita growth has an impact on election outcomes in the election year. However, for incumbent district leaders' it is only the average annual GDP per capita growth that matters for re-election. However, when we separate *luck* (district's performance due to regional or national economy) from *competence* (district's own economic performance), we find that *competence* matters for re-election in the election year, while *luck* matters for re-election in the average annual performance of the incumbents' tenure. The findings suggest that voters put more attention and vigilance on the incumbents' performances in the last year of their tenure, rather than on their whole tenure.

1. Introduction

Indonesia is a democratic country with the third-largest population in the world. To date, the country successfully held four general elections and three direct presidential elections. Since 2001 the Indonesian government has been implementing extensive decentralization. Under that scheme, the central government transferred some administrative and fiscal functions, as well as political power, to local governments at the provincial and district levels. In 2005, Indonesia implemented a “presidential” system, where the district head has to be chosen through a direct election. Participation of citizens in electing their district heads was proclaimed as the way to create an accountable local government. Unfortunately, local politics has not been free from bad political practices, such as money politics, and the unfair dominance of local elites (Mietzner, 2005, 2010). Hence, democratic accountability at the local government level appears to be an essential empirical question.

In this paper, we attempt to answer the question by investigating whether incumbent district heads were held accountable in their performances, during the first two cycles of direct local election in Indonesia. Specifically, we investigate whether voters punished incumbents when the economy was doing poorly, or rewarded them when

the economy was doing well. This study enriches existing literature in several aspects. First, this is the first study on Indonesia's local elections that investigates the determinants of a district government leader's re-election. The majority of studies in this strand of literature either investigated state/governor elections or national/cross-country elections (Hayes et al. 2015; Leigh, 2009; Berry and Howell, 2007; Jérôme and Jérôme-Speziari, 2005; Cutler, 2002). Moreover, Indonesia is a newly democratized and decentralized developing country; previous country-specific studies featured developed, democratic countries with an established federal system.

Secondly, departing from previous studies on “economy influenced” voting that considered voter attribution errors, our study uses the national economy as well as regional districts' economic performances as reference points for evaluation. This approach is based on insights from the “yardstick competition” literatures (Besley and Smart, 2007; Besley and Case, 1995; Salmon, 1987), which suggest that voters end up with asymmetric information on the incumbent candidate's competence. Voters commonly gather information about government officials from other districts and compare it with theirs, then based on that they decide whether to choose the same officials at the next election.

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Attribution error in this context is defined as a voter tendency to systematically fail to take sufficient account of externalities when aiming to assess incumbent competence (Wolfers, 2007). Several studies have documented the attribution errors in the context of retrospective economic voting. In the United States, Wolfers (2007) stated that governors in oil-producing states are more likely to be re-elected when the oil price is rising. In Australia, Leigh and McLeish (2009) argue that voters compensate the state government for “competence” (unemployment in their state relative to the rest of Australia) and “luck” (unemployment common to all states). Hayes et al. (2015) have recently verified these findings using cross-country data. However, most of these studies only use the performance of the higher economy (national or global) as a reference point to address voter attribution errors.

Thirdly, we test and control for potential sample selection bias, which is mostly neglected in previous literature. The risk of selection bias exists because data on re-election is only observed for an incumbent who is running for re-election. Using the Portuguese municipalities’ dataset, Castro and Martins (2013) find that the determinant of the mayors’ choice to run for an additional term in office is affected by the local economic performance. Castro and Martins (2013) finding implies that there are systematic differences between incumbents that are running and not running for re-election, which needs to be addressed using a selection model.

Fourthly, this study contributes to the literature on decentralization in Indonesia, especially on the debate on local government accountability. Skoufias et al.’s (2014) study shows that local governments become more liable to their poor citizens, while Sjahrir et al. (2014) recently found that the introduction of direct elections of district government heads does not reduce the degree of district government administrative expenditure overspending. They claim that this result implies the failure of local elections in establishing accountability. Previous literature also suggests that the Indonesian post-decentralization accountability framework is weak (Lele, 2012; Lewis, 2010; Calavan et al., 2009; Lewis and Pattinasarany, 2009), and some even argue it is the major deficit area in the decentralization of Indonesia (Lewis, 2010; Calavan et al., 2009). Therefore, we contribute to this debate by presenting an empirical study on whether the local economic performance matters in the re-election of incumbent district government heads. Hence, this study presents a new perspective on the empirical evidence concerning local government electoral accountability in decentralized Indonesia.

The estimates of this study suggest that the extent of such an attribution error is only quantitatively significant when the district performance is benchmarked using regional performance within the overall period of incumbents. When the regional district’s GDP per capita growth increased by one percentage point, the likelihood of an incumbent district head being re-elected, on average, increased by 3.2 percentage points. On the other hand, a one percentage point increase in unemployment in regional districts increased the likelihood of the incumbent district head being replaced by 13.1 percentage points. However, in election years, voters distinguish between district performance and national performance. In that case, the running district head is likely to be judged based on economic performance as the consequence of “competence”.

The rest of this paper is organized as follows. Section 2 reviews the literature on economic voting in local elections. Section 3 presents a short history of Indonesia’s local elections. Section 4 describes the model, and the dataset used is introduced in Section 5. The empirical results obtained are presented in Section 6, followed by robustness checks in Section 7. Section 8 concludes.

2. Literature review

This study is part of a broader literature on retrospective economic voting (for a literature review, see Dassonneville and Lewis-Beck, 2014; Duch and Stevenson, 2008; Lewis-Beck and Stegmaier, 2000, 2007; Van der Brug et al., 2007; Lewis-Beck and Paldam, 2000; Anderson, 2007). In brief,

retrospective voting is a reward-punishment model. It explains the way voters compensate the incumbent if they succeed in improving the economy. In contrast, the voters would disregard the incumbent if they failed. According to the rational choice theory, voters are always trying to hinder the chance of choosing the wrong and unqualified representatives in the election by re-electing the verified politicians (Key, 1966). The retrospective voting theory was later formalized by Barro (1973) and Ferejohn (1986).

Fearon (1999), in his selection model, stated that retrospective voters are those who chose the leaders based on the competence and performance after being elected. After scrutinizing the qualification and performance of the incumbent, people would decide to re-elect the leader at the next election or not (Duch and Stevenson, 2008; Persson and Tabellini, 2000). Based on this theorem, an election is considered as a good way to support the process in choosing the competent officials (Padró i Miquel and Snyder, 2006; Ashworth, 2005). Both the reward-punishment and selection model indicate that retrospective voting is effective in reducing moral hazards and adverse selection problems in the election.

The empirical literature on retrospective economic voting has shown that in many countries, economy is one of the critical issues on the national-level election (e.g., Canada: Happy, 1992; Nadeau and Blais, 1993, United Kingdom: Sanders, 2005, United States: Fiorina and Morris, 1981), economic development stages (e.g., Gélinau, 2007; Singer, 2013), and the types of institution (Anderson, 2006; Powell and Whitten, 1993; Whitten and Palmer, 1999). Overall, the literature on economic voting mostly focuses on national electoral contexts, whereas local elections have received relatively minor attention. Some researchers, however, have started to investigate whether local incumbents, especially at sub-national/district government, are responsible for the economic condition.

Within the studies, there are two streams of literature based on theoretical frameworks. Firstly, studies that are inspired by the political business cycle literature. Most of these studies empirically find that local incumbents strategically increase spending or reduce the tax burden when it comes to the election year (Sakurai and Menezes-Filho 2008, 2011; Veiga and Veiga, 2007; Vermeir and Heyndels, 2006). Second, studies based on the classic economic voting theorem, which assumes that voters consider the condition of the local economy (i.e., economic outcomes) when choosing the candidate during the local election. Recent studies show that incumbents are responsible for their performance in office, and one of the performance’s indicators is the local economy (Boyne et al., 2009; Berry and Howell, 2007; Oliver and Ha, 2007).

However, these studies failed to take into account the possibility of an attribution error in their estimation. Psychological literature defines “fundamental attribution error” as the human tendency to fail to consider background/external factors while assessing a candidate’s competence (Patty and Weber, 2007). In a cross-country study, Leigh (2009) examines whether the leader in each country gets an advantage from comparing the global macroeconomic performance and their country’s condition. He found that voters are incapable of identifying the signal from the mass; they are more aware of the global economic performance than their country’s condition. However, Hayes et al. (2015) shows that voter attribution errors are less likely to appear in countries that have experienced a long period of democracy, that have educated voters as well as free media.

In the single-country context Wolfers (2007), using a dataset from US gubernatorial election, found that voters also assess the incumbent based on economic fluctuations that might not even be related to the local government responsibility, besides observing their state’s economy relative to the national economy.

3. Local election in Indonesia: institutional setting

Indonesia has implemented “Big Bang” governance reforms since 2001, with two of the most important pillars of this reform being decentralization and democratization. The fiscal decentralization reform that was enforced in 2001 regulates the central government to transfer

40% of the budgetary responsibility to the provinces, as well as districts and other important functions such as education (primary and secondary level), health service, environment, and infrastructure (World bank 2008). Under this regulation, the local government is given more power to utilize financial resources and manage the region.

The democratization reform took place through two waves. Firstly, after the *New Order* regime collapsed in 1999, and secondly, when Law number 32 was issued in 2004. The regulation changed the way the regional government head is elected. Before 2004, the regional government head was elected by the local parliament. Since 2004 the district and provincial level heads are directly elected by the citizens through a local election that is held every five years. However, the first implementation of the law has been equivocal. The only requisite condition for the region to enforce the regulation was the completion of the district head's tenure. Therefore, only one-third of all districts in Indonesia switched the electoral system from indirect election to direct election in June 2005. Meanwhile, the rest of the districts continued with the old system until the district head's tenure was over.

The implication of varying local election timings across districts, is that the evaluation of the performance of each district must be adjusted with respect to the tenure of local heads, which means that even though the time interval of the tenure is the same for all districts (5 years), the starting/end year of the tenure could be different across districts. On the negative side, it complicates the calculation of district performances. On the positive side, we argue that by having different election timings, the performance of each district can be isolated from time-specific shock. This means that each district's performance is less affected by other districts, and facilitates a performance assessment that is relatively more accurate in capturing individual district achievements.

According to the Ministry of Home Affairs (MoHA), there were in total 963 local elections within 2005–2013. Since the tenure of a local district head is five years, elections between 2005–2013 can be divided into two periods. The first period includes elections that occurred between 2005–2008, and the second period refers to elections that occurred between 2010–2013. Most of the districts experienced their first direct election in the first period and their second direct election in the second period, except for several new districts that had their first direct election in the second period.

Overall this study managed to collect 88.06% of the local election data over 2005–2013. This local election data includes 362 out of 454 elections (80%) in the first period (2005–2008) and 486 out of 509 elections (95%) in the second period (2010–2013). For the record there was a local election in 2009, when there should have been none that year since it was a national election year (the local election was initially scheduled in 2008).

4. Model specification

4.1. Retrospective economic voting model

A Probit model will be used to explain how a district's economic performance (*Eco*) influences the probability of re-election concerning the heads of district governments, given certain control variables relating to political and demographic conditions of the districts (*Cont*). The model can be mathematically presented as follows:

$$Prob(Reelect = 1 | Eco, Cont) = \Phi(Eco' \beta + Cont' \gamma) \tag{1}$$

Where β and γ are the vectors of the parameters to be estimated, and $\Phi(\cdot)$ is the normal cumulative distribution function. As the Probit model is estimated over a panel of 497 district governments (i) for the two cycles of local elections (E) that took place between 2005 and 2013, a panel data analysis is considered.

The application of a binary model to panel data analysis is straightforward. The structural model for the panel data to be estimated in this study can be written as follows:

$$y_{i,E}^* = \alpha + Eco'_{i,E} \beta + Cont'_{i,E} \gamma + \varepsilon_{i,E} \tag{2}$$

where, $i = 1, \dots, 497$ and $E = 1, 2$

$$Reelect_{i,E} = \begin{cases} 1 & \text{if } y_{i,E}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\varepsilon_{i,E} \sim N[0, 1]$$

The $y_{i,E}^*$ variable shows the probability of the district head being re-elected, considering all explanatory variables, for districts i at election E . Nevertheless, $y_{i,E}^*$ is not observable. One can only observe $Reelect_{i,E}$, which is a binary-choice variable to indicate whether or not the last district head is re-elected in the current election. Whereas α is a constant term, $Eco'_{i,E}$ and $Cont'_{i,E}$ are matrices of the set of observable independent variables that linearly determine $y_{i,E}^*$, β and γ are vectors of coefficients associated with $Eco'_{i,E}$ and $Cont'_{i,E}$, and $\varepsilon_{i,E}$ is the error term, normally distributed with zero mean and unit variance (Greene, 2003).

We conduct an LR test for random effects to test the suitability of panel regression estimation procedure (for details see Tables 3 and 4 in the Appendix). The LR test of $\rho = 0$ are resulting in Chibar² (01) that ranging from 0.000012 to 0.33 with estimated p -value ranging from 0.499 to 0.282, meaning ρ is statistically zero in all specifications. Thus, the panel-level variance component is unimportant, and the panel estimator is not different from the pooled estimator. Therefore, we decided to estimate a simple pooled Probit, where the presence of heteroscedasticity and autocorrelation is controlled when using robust standard error clustered by province. For the record, we did not test for fixed effect since adding fixed effect on Probit models induces bias in the coefficients and standard errors, due to the incidental parameter problem (Wooldridge, 2002).

The risk of selection bias in Eq. (2) exists, however, because data on re-election is observed only for an incumbent running for re-election. If systematic differences exist between incumbents that are running and not-running for re-election, regressions based on a restricted, non-random sample of running incumbents will only be subject to specification error and generate biased results (Greene, 2003; Van de Ven et al., 1981). A Heckprobit selection model is also applied in this study to control potential sample selection bias. This technique is based on Heckman's (1979) sample selection model, which was designed for linear outcome equations. The Heckprobit has been adapted for discrete dependent variables where both the selection equation and the outcome equation are binary choices (Van de Ven et al., 1981).

Whether or not data is observed for incumbent re-election depends on the incumbent's eligibility and also his/her personal decision to run as a candidate in the election. The selection model is a Probit model which in its application in this context can be expressed as:

$$z_{i,E}^* = \theta + x'_{i,E} \delta + u_{i,E} \tag{3}$$

where, $i = 1, \dots, 497$ and $E = 1, 2$

$$Candidacy_{i,E} = \begin{cases} 1 & \text{if } z_{i,E}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$u_{i,E} \sim N[0, 1]$$

$$corr[\varepsilon_{i,E} u_{i,E}] = \rho$$

The $z_{i,E}^*$ is an unobservable variable representing the probability of the incumbent district head running for re-election in terms of the explana-

tory variables contained in $x'_{i,E}$ for districts i at election E . $Candidacy_{i,E}$ is a binary variable to indicate whether or not the last district head is running at election E . Whereas θ is a constant term, $x'_{i,E}$ is the set of observable independent variables that linearly determine $z'_{i,E}$, δ is vectors of coefficients associated with $x'_{i,E}$, and $u_{i,E}$ is the error term of the selection equation, normally distributed with zero mean and unit variance, and ρ denotes the correlation between the error terms of the outcome and selection equations.

The value of ρ is used to evaluate the risk of selection bias. If it is statistically proven that $\rho = 0$ then there is no evidence of selection bias, which means the re-election and selection equation are independent, making estimation of the selection model unnecessary. In this case, it would be better to estimate only the re-election equation with the standard Probit model, since it will deliver more consistent and unbiased estimates. However, if ρ differs significantly from zero, standard Probit techniques applied to the re-election equation will produce biased results. The Heckprobit procedure instead provides consistent, asymptotically efficient for all the parameters in such models (Pastore, 2012; Van de Ven et al., 1981).

We consider five variables that determine the candidacy decision: district economic performance, number of candidates running in the election, district establishment period, and the electoral cycle. The better the economic performance of a district, the more likely an incumbent is to run for re-election, since the probability of winning would be greater. The more candidates running in the election, the less likely the incumbent is to run for re-election since the number of candidates reflects the intensity of political competition; more candidates mean more competition and less probability for re-election.

We also argue that the district establishment period matters for candidacy. Newly established districts are more likely to not have an incumbent running in the election, especially those established within 1–2 years prior to the election. On the contrary, older districts are more likely to have an incumbent running in the election. The electoral cycle also matters in determining candidacy. It is reasonable that the first cycle of local elections has a higher candidacy than the second cycle. This is because the law mandates that a district head can only rule for two terms, so those incumbents that have been re-elected in the first cycle of local elections (2005–2008) by law are not allowed to run for re-election in the second cycle (2010–2013).

4.2. Filtering “competence” from “luck”

The estimation of the effect of district economic performance on a district leader's probability of re-election in the model (2) is ignoring the risk of ‘attribution error’ discussed in the previous section. This is because the design of the model is unable to differentiate whether the incumbent was re-elected due to “competence” or “luck”. To distinguish between the effect of “competence” and the effect of “luck”, we follow the methodology proposed by Bertrand and Mullainathan (2001) which has recently been adopted by Wolfers (2007), Leigh (2009), Leigh and McLeish (2009) and Hayes et al. (2015). We restructure the model by separating the district economic performance into “luck” and “competence” in two ways. Firstly, by using regional districts economic performance (Reg), as follows:

$$y_{i,E}^* = \alpha + (Eco'_{i,E} - Reg'_{i,E})\beta + Reg'_{i,E}\phi + Cont'_{i,E}\gamma + \varepsilon_{i,E} \quad (4)$$

Secondly, by using national economic performance (Nat), as follows:

$$y_{i,E}^* = \alpha + (Eco'_{i,E} - Nat'_E)\beta + Nat'_E\phi + Cont'_{i,E}\gamma + \varepsilon_{i,E} \quad (5)$$

where, $i = 1, \dots, 497$ and $E = 1, 2$

$$Reelect_{i,E} = \begin{cases} 1 & \text{if } y_{i,E}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\varepsilon_{i,E} \sim N[0, 1]$$

As in the previous equations the $y_{i,E}^*$ variable shows the probability of the district head being re-elected, considering all explanatory variables, for districts i at election E , where $y_{i,E}^*$ is unobservable so that we have to rely on $Reelect_{i,E}$, which is a binary-choice variable to indicate whether or not the last district head is re-elected in the current election. Whereas α is a constant term, $Eco'_{i,E}$ and $Cont'_{i,E}$ are sets of observable independent variables that represent the district's economic performance and political-demographic condition, respectively.

The $Reg'_{i,E}$ is an average economic performance of all districts within the same province for district i at election E . The Nat'_E is the national economic performance at local election E , which is constant across districts. Meanwhile, γ is a vector of coefficients associated with district political and demographic characteristics ($Cont'_{i,E}$), and $\varepsilon_{i,E}$ is the error term, normally distributed with zero mean and unit variance.

The β now represents vectors of coefficient characterized as the effect of the incumbent's “competence”, while ϕ is a vector of coefficients that measure the effect of “luck”. If the voters are rational and perfectly able to filter “competence” from “luck” then $\phi = 0$. Conversely, the literature on ‘attribution errors’ suggests that voters may fail to take sufficient account of background or environmental factors in assessments of competence, leading to $\phi > 0$.

However, like Eqs. (2), (4), and (5) are also at risk of selection bias because data on re-election is still only observed for incumbents who run for re-election. Therefore, we also apply Heckprobit selection model as in Eq. (3) to control for potential sample selection bias in Eqs. (4) and (5).

5. Data

In order to analyze the case of Indonesia, we collected data for the 497 districts over the period 2000–2013, covering the two electoral cycles of 2005–2008 and 2010–2013. The political data sets at the district level are constructed based on information of local direct election results within 2005–2013 from the Local General Election Commission (KPUD) and the McCulloch (2011) database of the district leaders from 2001 to 2007. The political data which is the main interest of this study is the re-election of the incumbent district leader. However, it is important to note that McCulloch's (2011) database uses 2001 as a reference point to amalgamate back the data if districts subsequently split after 2001. Hence, the re-election of the incumbent district leader in local election 2005 for the new district, which split from its original district after 2001, is unobservable.

To characterize the district economic performance, we use the per capita GDP growth and unemployment rate. These two are among the three variables that have received the greatest empirical attention in the voting literature: the unemployment rate, inflation, and GDP growth. Inflation is not included for two reasons: at the regional level there is no data on inflation; it is under the authority of the central bank, not the district head. The economic performance data is taken from the Central Bureau of Statistics (BPS) and the World Bank Indonesia database (INDODAPOER).

To control for variations in district characteristics, we include sets of demographic variables. These demographic variables are the share of population living in urban areas, the share of population density, the share of the working-age population, the share of retired-age population, total population, literacy rate, ethnic and religious diversity, and a dummy variable for districts located in Java (the most developed island in Indonesia). In addition to the demography, we also include variables to control fiscal and political characteristics of the districts.

The description of all variables can be found in the Appendix, in Table 1, while the descriptive statistics are reported in Table 2. For the record, the unemployment data at the district level is only available from 2007 onwards, and this explains why in Table 2 unemployment has the lowest number of observations compared to other variables.

6. Empirical results

6.1. Baseline results from retrospective model

All of the estimation results of this paper are reported in the Appendix. The baseline results of this study are presented in Tables 3 and 4. These are an estimation of the pooled Probit model of the Eq. (2). Following Veiga and Veiga (2010) and Castro and Martins (2013), in order to determine which time horizon of economic performance is important for the voters, we expressed the economic variables in two different ways: first, as percentage changes from the previous year at the election year; and second, as average percentage annual changes over the entire term of incumbents (started from the previous election year). Since the possibility of re-election is zero if no incumbent is running in the election, the baseline estimations drop observation of elections where the incumbent is not running for re-election.

For each variable presented in Tables 3 and 4, the estimated coefficients and the average marginal effects are shown. The robust standard error for both the estimated coefficients and average marginal effects are presented in parentheses, and the degree of statistical significance is indicated by asterisks. The number of observations, log-likelihood and *Pseudo-R*², and likelihood-ratio test for random effect (*Random Effect Test*), are reported at the bottom of each table. A likelihood-ratio test formally compares the pooled estimator (Probit) with the panel estimator. The test in Table 3 and 4 statistically proves that ρ is zero, which indicates that the panel-level variance component is unimportant, and the panel estimator is not different from the pooled estimator.

Table 3 reports the impact of GDP per capita growth (*gYp*) on the probability of re-election of the incumbent district leader, while Table 4 reports the impact of change in the unemployment rate (ΔUR). Examining the estimation results of economic performance in Tables 3 and 4, we find that both the GDP per capita and the unemployment are, to some degree, relevant for a district leader's re-election. The marginal effect of Probit regressions in Table 3 indicates that an incumbent district head is 0.4 % (column 4) more likely to be re-elected for every increase of the GDP per capita growth in the election year. It is important to note that the mean of GDP per capita growth in the election year in the sample is 3.6%, while the incumbents are 66.8 % more likely to be re-elected (see Table 1).

Meanwhile, focusing on the marginal effect of change in the level of unemployment rate in Table 4, we find that a 1 % decrease in the unemployment rate in the election year increases the probability of an incumbent district head winning the election by 3.9% (column 4). These baseline results suggest that unemployment can have a more substantial impact on re-election compared to GDP per capita growth. However, the fact that none of the economic performances are significant over the entire term seems to indicate that the voters are on average "myopic" rather than "far-sighted" (Hellwig and Marinova, 2015), in which case, they focus too much on election-year performance and ignore overall performance under the incumbent's government administration.

The demographic and political control variables are also found to be relevant in explaining the re-election of the district head. In Tables 3.3 and 3.4, the regressions find some evidence that the likelihood of a district head being re-elected for another term is greater in more urbanized districts (*Urban*). This might be because the incumbent's political campaign was more effectively delivered in more urbanized districts due to better infrastructure. The share of young-working-age (*Young*) and elderly (*Old*) populations also increases the likelihood of the incumbent district head's re-election. However, the share of the old population marginal effect is more than twice that of the young population. This implies two possibilities: either the votes of the elderly are easier to win, or in politics the elderly are more loyal than the young.

The district population size (*LnPop*), literacy rate (*Literacy*), and the dummy for districts located in the island of Java (*Java*) are consistently insignificant in both Tables 3 and 4. The other two demographic control

variables: ethnic (*Ethnic*) and religious fractionalization (*Religion*), are not significant for the growth equation (Table 3). On the contrary, both variables are significant in the unemployment equation (Table 4) with an opposite sign. The ethnic fractionalization is positive, which means the likelihood of re-election is higher for an incumbent running in more ethnically heterogeneous districts. For religious heterogeneity, however, it is reversed. The incumbent running for re-election in a more religiously diverse district has a lower probability of being re-elected, compared to an incumbent running in a less religiously heterogeneous district. It suggests that ethnic diversity contributes to political stability, while religious diversity is destabilizing.

In both Tables 3 and 4, the numbers of candidates running in the local election (*Ncandidate*) and the dummy variable for the presence of independent candidates in the election (*Independent*) have a significant and consistent impact on district leaders' re-election probability, which implies that, the probability of being re-elected decreases when the number of contesting candidates increases. This makes sense since we expect that an election with a large number of candidates will have a more intense political competition and weaken the probability of re-election. However, it could also be because the higher the probability of the re-election of the incumbent (higher popularity), the more reluctant other potential candidates are to challenge for the position. The marginal effect of the dummy variable for independent candidates is positive, which indicates that the incumbent running in an election where there are independent candidates has a better opportunity to be re-elected. The voter turnout, however, is consistently insignificant. To address the issue of selection bias, we use the Heckprobit model to re-estimate the growth and unemployment determinant of re-election. The results are presented in Tables 5 and 6. The tables also present the results of the first stage of the Heckprobit regression, the *Candidacy Selection Equation*, in the second panel of the tables.

The results of the selection equation in Tables 5 and 6 indicate that the number of candidates (*Ncandidate*) and the dummy for the second electoral cycle (*Elect.Cycle*) have a highly significant and negative influence on the probability of re-election for the incumbent running as a candidate. These results are reasonable since more candidates mean more competition, so less incentive for running as a candidate, whereas candidacy is lower in the second electoral cycle because the incumbents that have been re-elected in the first cycle are not allowed by law to run for re-election.

Tables 5 and 6 also show the significance test for the model selection (Wald test of independent equations) in the last panel. The significance test for ρ in Table 5 statistically proves that ρ differs significantly from zero. This justifies the use of Heckprobit selection models for the growth model of re-election in Table 5.

However, the selection test in Table 6 is statistically proven that $\rho = 0$. This means there is no evidence of selection bias, and the re-election and candidacy equation are independent, making estimation of the selection model unnecessary. In this case, it would be more appropriate to refer the unemployment effect on re-election to the estimation of the equation with the standard Probit model in Table 4 rather than the Heckprobit estimation in Table 6, since it will deliver more consistent and unbiased estimates.

The results of Table 5 indicate that after controlling for selection, we observe a positive effect of GDP per capita growth in all time horizons. However, the effect is quite small: based on the marginal effect of Heckprobit regressions in Table 5, an incumbent district leader is 0.3 % (column 4) more likely to be re-elected for every extra percentage point of GDP per capita growth in the election year, which is 0.1% lower than the baseline estimation in Table 3. On the contrary, an extra percentage point of annual average GDP per capita growth within the incumbent's tenure increases the likelihood of an incumbent's re-election by 0.4%.

These results suggest that in terms of GDP per capita growth, voters are evaluating incumbent performance in both the short-run (election year) and the long-run (average within tenure), with a slightly larger concern for the long-run.

6.2. Competence vs. luck

To test whether the impact of economic conditions on local elections is caused by voters rewarding “luck” or “competence”, we separate the district economic performance into “luck” and “competence” in two ways. Firstly by using the regional districts' economic performance, as in Eq. (4), and secondly by using the national economic performance, as in Eq. (5). In the first specification, “luck” is defined as performance due to common regional shocks, while “competence” is defined as the gap between the district performance and the average performance of other districts within the same provinces. The simple pooled Probit model estimation of this specification are presented in Tables 7 and 8. In the second specification, “luck” is defined as national economic performance (performance due to the national economy), while “competence” is defined as the gap between district and national performances. The pooled Probit estimation of the second specification is presented in Tables 9 and 10.

The likelihood-ratio tests for random effect (Random Effect Test) are reported at the bottom of each table of Tables 7, 8, 9, and 10. These tests compare the pooled estimator (Probit) with the panel estimator. The tests in Tables 7, 8, 9, and 10 statistically prove that ρ is zero, which indicates that the panel-level variance component is unimportant, and that the panel estimator is not different from the pooled estimator. The simple Probit model estimation of Tables 7, 8, 9, and 10 only utilized elections where an incumbent candidate is running for re-election, since the possibility of re-election is zero if no incumbent is running in the election.

Across these four specifications (Tables 7, 8, 9, and 10), we find consistent evidence suggesting that “luck” only benefits incumbents when it is defined as regional district performance, and within the timeframe of the overall performance of the incumbents. We find that a one percentage point rise in the annual average of per capita GDP growth of regional districts ($gYp_{regional}$) during an incumbent's tenure increases his/her probability of winning office by 3.2 percentage points (column 2 of Table 7), while a one percentage point decrease in unemployment of regional districts ($\Delta UR_{regional}$) during the same period increases the incumbent's probability of re-election by 13.1 percentage points (column 2 of Table 8). However, we do not find that any “luck” variables matter when “competence” is filtered using national performance (Tables 9 and 10), neither in term growth ($gYp_{national}$) nor unemployment ($\Delta UR_{national}$).

Furthermore, we only find evidence of the “competence” effect on re-election in terms of unemployment ($D\Delta UR_{regional}$), and no evidence of “competence” in terms of GDP per capita growth ($DgYp_{regional}$) when it is filtered using regional performance (Tables 7 and 8). Based on the marginal effect of Probit regressions in Table 8, an incumbent district leader is 3.5 % (column 4) more likely to be re-elected for every extra percentage point of unemployment reduction – relative to his/her regional districts – in the election year.

However, when “competence” is filtered from “luck” using national performance, we find evidence of the “competence” effect on re-election for both growth and unemployment (Tables 9 and 10). We find that if the district's growth has outpaced national growth ($DgYp_{national}$) by one percentage point over the election year, it only raises the incumbent's chances of re-election by 0.4 percentage points (column 4 of Table 9), while if the district's unemployment decreases a percentage point faster than the decrease in national unemployment ($D\Delta UR_{national}$) over the election year, it increases the incumbent's probability of re-election by 3.8 percentage points (column 4 of Table 10).

Putting the results of Tables 7, 8, 9, and 10 together, it seems that voters are only successful in separating incumbent “competence” from national performance (“luck”) during the election years, and are unable to distinguish “competence” from regional performance (“luck”) in an incumbent's overall tenure. These results are somewhat understandable, since voters are more likely to be more informed about the national economy than the regional economy due to national media penetration, so it is easier for voters to differentiate their own district's performance

from the national performance, and less easy for them to differentiate it from the regional performance. Moreover, a shorter period of performance (election year) is also easier for voters to evaluate rather than a longer period of performance (average within tenure). However, the risk of selection bias in the estimation of Tables 7, 8, 9, and 10 exists because data on re-election is observed only for an incumbent who is running for re-election.

To address the issue of selection bias, we use the Heckprobit model to re-estimate the “luck” & “competence” effects of growth and unemployment on re-election. The results are presented in Tables 11, 12, 13, and 14. The second panel in these tables presents the results of the first stage of the Heckprobit regression (*Candidacy Selection Equation*). Meanwhile, the significance test for the selection model (Wald test of independent equations) is presented in the last panel of these tables. Overall, the selection test is only significant in the growth model (Tables 11 and 13), and not in any of the unemployment models (Tables 12 and 14).

All the selection tests in Tables 12 and 14 statistically prove that $\rho = 0$. This means that there is no evidence of selection bias, and that the re-election and candidacy equation are independent, making estimation of the selection model unnecessary. Thus, it would be appropriate to refer to the standard Probit model estimation in Tables 8 and 10 for the “competence” and “luck” effects of unemployment on re-election.

The results of the selection equation in Tables 11 and 13 indicate that, consistent with the baseline estimation, the number of candidates (*Ncandidate*) and the dummy for the second electoral cycle (*Elect.Cycle*) have a highly significant and negative effect on the probability of an incumbent running for re-election. The significance test for ρ in Table 11 statistically proves that ρ differs significantly from zero for the election year period (column 3 of Table 11). This indicates a problem of selection bias, which verifies the need to run a Heckprobit selection model to estimate the “competence” and “luck” of the growth effect in the election year on re-election, as presented in Table 11. However, the selection test appears to be insignificant for the average tenure estimation (column 2 of Table 11), whereas, in Table 13 the selection model verifies the need to run a Heckprobit selection model in both time horizons: election year (column 2) and the average within an incumbent's tenure (column 4).

The results of Table 11 indicate that after controlling the selection and filtering “competence” from “luck” by regional districts performance, we observe that neither “competence” and “luck” of a district's GDP per capita growth at election year matters for re-election. However, the results of Table 13 indicate that after controlling the selection and national performance, only “competence” in a district's GDP per capita growth matters for re-election, both on average within an incumbent's tenure and during the election year. According to the marginal effect in Table 13, an extra one percentage point rise of a district's annual average GDP per capita growth that outpaced national average growth ($DgYp_{national}$) increases the likelihood of incumbent re-election by 0.4% (column 2); whereas an extra percentage point of district's growth in the election year that outpaced national growth, increases the likelihood of incumbent re-election by 0.3% (column 4).

7. Robustness analysis

The assessment of the causal effect of district economic performances on re-election (in the previous section) is at risk of endogeneity, since these performances are probably not exogenous, but depend on the policies chosen by incumbents in response to anticipated votes (personal popularity). We can expect incumbents who anticipate a close race (those with a lower probability of re-election) to devote more effort in improving their district's economic performance in order to win the election. In other words, the estimates in the previous section may suffer from endogeneity problems, since the probability of re-election could also affect economic performance.

As a robustness check to test for the presence of endogeneity, we estimate IV-Probit, where we apply measures of district revenues, fiscal

capacity, and regional and national performances as instruments for the districts' economic performance. These instruments are used because they have a direct influence on district economic performances but not directly on re-election, and their variations are largely determined by external, rather than internal, factors within districts. We will explain the reasons for using these instruments in the following passages.

Most of the districts' government revenue is composed of central government transfers (nationally it is more than 90% of total districts' revenue), which are allocated based on a certain formula designed by the central government, making it impossible for districts to influence. When district revenue is high, more resources are available for that district to improve its economic performance. The fiscal capacity, on the other hand, measures the proportion of revenue which district governments can flexibly use and allocate. These are composed of district governments' own-source revenue (PAD) and revenue sharing (DBH), which the local government has the authority to allocate, unlike transfers that are largely designated by the central government to fund specific spending. The higher the fiscal capacity, the greater the capacity of the local government to stimulate its economy.

Meanwhile, we can expect regional and national economies to influence the district economies due to common regional or national shocks, but not the other way around. The internal factors within districts are arguably too small to influence regional and national economies. Furthermore, based on the estimation in the previous section, we could to a certain extent be sure that regional and national performances do not affect (or have a minimum effect) on the voters' decision to re-elect the incumbents.

Tables 15, 16, 17, 18, 19, and 20 in the Appendix show the first- and second-stage estimations of IV-Probit for each of the specifications. The first-stage estimation is a linear regression of the district economic performance against fiscal capacity, district revenues (*LGRevenue*), regional and national economic performance, controlling for demographic, political, and geographic characteristics. The second-stage estimation (IV-Probit) is a Probit model of re-election against a fitted value of district economic performance from the first-stage, and a set-off control variables for districts' demographic, political and geographic characteristics. By default, IV-Probit uses maximum likelihood estimation. As documented in Tables 15, 16, 17, 18, 19, and 20 in the Appendix, overall, the first stage regression reveals that the instruments which are most frequently significant in influencing re-election are district government revenue (*LGRevenue*), followed by regional performance. Both instruments have a positive relationship with re-election. Meanwhile, the results of the second stage estimation (IV-Probit) in Tables 15, 16, 17, 18, 19, and 20 will be explained individually in the following passages.

In each table, we run a test of exogeneity (Wald test of exogeneity). Basically, it tests whether the correlation coefficient of the error of the first and second regressions is statistically different from zero. If the test is statistically significant, we may reject the null hypothesis that the district economic performance variable is exogenous, which lends support to the IV-Probit estimation. If the test is not significant, then we cannot reject the null hypothesis, and the multivariate Probit model estimates are more appropriate. The test results are presented in the bottom panel of each table.

For three of the six tables reported in the Tables 15, 16, 17, 18, 19, and 20, the effect of district economic performance on re-election is statistically significant. These three tables are Tables 15, 18, and 19. In these tables, we also find that the exogeneity test of the instrumented variables is statistically significant, meaning that for these outcomes, we can reject the null hypothesis that district economic performance is an exogenous variable. Therefore, the IV-Probit estimates are more appropriate in these three specifications, since it produces consistent and more efficient estimates than the simple Probit model.

The IV-Probit estimation of Table 15 finds that in baseline specification, GDP per capita growth (*gYp*) significantly influences re-election only for the overall period of the incumbent, but not for the election year. The IV-Probit coefficient of growth in this specification is

significant at 1% and is recorded at 0.082, which is equal to a marginal effect of 0.2%. This is 50% lower from the marginal effect recorded in Table 5 for the same period, which is 0.4%. However, unlike Table 5, the IV-Probit estimation does not find statistical evidence of the impact of GDP per capita growth on the election year on re-election. Although the exogeneity test of average tenure specification in Table 15 is significant, the test of the election year specification is not statistically significant, which means a regular Probit regression, as in Table 3, is more appropriate.

The IV-Probit estimation of Table 18 finds that the coefficient of the "competence" element of change in unemployment, filtered by regional performance (*DΔUR_{regional}*), is significant at 1% for the average tenure specification. The coefficient is recorded at 1.008, which is equal to a marginal effect of -0.37%. Unfortunately, it is incomparable since the previous estimation of "competence" for unemployment within the average tenure is always statistically insignificant, but the fact that the marginal effect is negative supports the previous findings. Table 18 also finds that the "competence" effect of unemployment on re-election is statistically significant (at 5%) for an election year specification. However, unlike the average tenure specification, the exogeneity test for an election year specification is insignificant, suggesting insufficient evidence to consider district economic performance as an endogenous variable in this specification. Therefore, the Probit estimates might be consistent and more efficient.

In Table 19, the "competence" coefficients for GDP per capita growth filtered by the national performance are positive and significant, for both the average tenure and the election year specifications. However, the exogeneity test is only significant in the average tenure specification. This means that endogeneity does not seem to be a critical issue for the election year specification; therefore the Probit estimates might be consistent and more efficient; however, the IV-Probit estimation is more appropriate for the average tenure specification. The coefficient of "competence" of the average growth within the tenure is 0.082, which is statistically significant at 1% and equal to a marginal effect of 0.2%. Consistent with the finding in Table 15, this is 50% lower than the previous estimation in Table 13.

Overall, even though the IV-Probit estimation of the district performance effect on re-election is lower than the estimation strategy in the previous section, the main finding is robust: district economic performances do seem to increase the probability of the incumbent's re-election.

8. Conclusion

The main purpose of this paper is to examine whether the economy affects the probability of incumbent district heads to be re-elected across Indonesia. Since the decentralization policy was enacted in 2001, Indonesian local governments have a wider range of authority and resources for stimulating local economic activity. In this newly decentralized governance, local governments are responsible for improving the well-being of people in their region. From 2005, to strengthen the accountability of local governments, district government heads were selected through direct elections. In this new structure of governance, it is fair to expect that incumbent district heads will assume responsibility for local economic performance.

We examine the question using a dataset for the first two cycles of Indonesia's local election (of district heads), from 2005 to 2013. Overall it includes 848 direct local elections. We estimate a vote function that models the effects of the local economic environment, taking into account the effect of both the regional and national economies. We started by using a simple Probit model and Heckprobit model to test whether the probability of an incumbent district head's re-election is affected by local economic factors. Then we tested the attribution error in a model that determined whether the incumbent district head's re-election was due to "competence" (district economy own-performance) or "luck" (district's performance due to regional or national economy). We also employed the

IV-Probit model to check whether endogeneity affects re-election outcomes, and also as a robustness check of the Probit and Heckprobit results. We measure economic performance using GDP per capita growth and change in unemployment.

In brief, we find that in an election year, voters are successfully disentangling competence from luck. No evidence of attribution error occurs within this timeframe. This is especially true for a reduction in unemployment; whether it is benchmarked regionally or nationally. We find that one extra percentage point of a district's unemployment reduction raises the incumbent's chances of re-election by 3.5 percentage points if it is benchmarked against regional districts, and by 3.8 percentage points if it is benchmarked against the national performance. Meanwhile, in the case of GDP growth per capita in an election year, voters could only successfully separate competence from luck if it was benchmarked against the national performance. We find that one extra percentage point of a district's GDP per capita over the national economy raises the incumbent's chances of re-election by 0.3 percentage points.

However, voters failed to vote based on competence when performance was described as an annual average economic change during an incumbent's tenure. The only cases where competence mattered was when the GDP per capita growth was benchmarked against the national performance. An extra percentage point of GDP per capita annual average growth of the district, measured against the national average, will raise the incumbent's chances of re-election by 0.4 percentage points. The evidence of attribution error is also found in this timeframe, both for GDP per capita growth and changes in unemployment, but only when district performance was benchmarked against regional districts.

Putting the results together, it appears that the voters' ability to filter incumbent district leader competence from luck was more accurate for their performance in the election year, rather than their performance during their whole tenure. This suggests that voters do not take into account the full extent of an incumbent's economic record. Instead, voters pay more attention to performance in the last year rather than the whole tenure (Achen and Bartels, 2004). It implies that performance in the last year of a tenure matters most for an incumbent's probability for re-election, which supports the recent empirical finding on the existence of a political budget cycle in Indonesia during the local direct elections periods, especially if the incumbent runs for re-election (Sjahrir et al., 2013). Also, our findings correspond to that of Sakurai and Menezes-Filho (2008), who found that mayors in Brazilian municipalities who spent more during their tenure had a higher probability of re-election, especially those who spent it in years directly preceding an election. These previous studies confirm our conclusion that the economy does matter in local government executive elections.

Declarations

Author contribution statement

Rumayya: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Anu Rammohan: Analyzed and interpreted the data; Wrote the paper.

Rudi Purwono, Iman Harymawan: Contributed reagents, materials, analysis tools or data; Wrote the paper.

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