

Economic voting in a fragile democracy: Evidence from presidential elections in Madagascar

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Abstract

This paper examines the electoral consequences of a sharp rise in the global price of vanilla, a major agricultural export for Madagascar. The price shock resulted in sizable electoral gains for the incumbent president of Madagascar in vanilla-growing regions: compared to areas without vanilla cultivation, vanilla-growing precincts saw a relative increase in incumbent vote share of 25 percentage points between the 2013 and 2018 elections. The effect appears to be driven by substantial gains in household wealth in vanilla-growing areas. Survey respondents in vanilla areas are more positive about the direction of the country and the overall economy, though we find no strong evidence that they attribute these outcomes to government policy. The increase in support for the incumbent president could be due to a relationship between household economic resources and a preference for the status quo. The findings show that changes in commodity prices carry meaningful electoral stakes through economic voting even in fragile democracies, where democratic transfer of power is uncertain.

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1 Introduction

There is a wide range of evidence that changes in economic conditions can affect voter behavior. Existing studies have identified electoral consequences of a variety of economic shocks, including macroeconomic conditions (Ebeid and Rodden 2006), trade shocks (Autor et al. 2020), the stock market (Crane et al. 2024), and housing prices (Larsen et al. 2019). This evidence includes cases where the source of the shock is less connected to domestic policy, such as climate shocks and natural disasters (Amirapu et al. 2022; Blankenship et al. 2021), exchange rate policies in other countries (Ahlquist et al. 2020; Herreño et al. 2023), and lottery winnings (Bagues and Esteve-Volart 2016). Support for incumbent leaders tends to increase after positive shocks and decline after negative shocks. But open questions remain about many aspects of this relationship, including the size of the effects, which leaders receive the credit or blame, and what is driving voter behavior (Anderson 2007; Healy and Malhotra 2013; Margalit 2019). There is debate about whether voters respond differently based on the source of the shock, such as whether income changes are related to market conditions, government transfers, or some other source (Tilley et al. 2018), or whether the shocks are connected to domestic policy versus external factors such as changes in international prices (Hellwig and Samuels 2007; Duch and Stevenson 2010; Kayser and Peress 2012).

In many lower-income countries, fluctuations in agricultural and commodity prices play an important role in driving changes in living standards. Changes in international prices have been shown to influence electoral outcomes (Campello and Zucco 2016; Novaes and Schiumerini 2022). In many cases, the causes of fluctuations in international prices may be unrelated to government policies. But domestic governments can still shape the ultimate impacts of these price changes on individuals and households, and this is especially the case when it comes to policy at the national level. Governments can reduce the impacts of negative price shocks by instituting social insurance or promoting a broad industrial base, for example. Governments can also intervene in commodity markets more directly, through trade restrictions, marketing boards, and support payments. Understanding how voters

respond to these types of shocks can help us understand the incentives that policymakers face, which in turn shape the policies that get implemented.

This paper studies the impacts on the 2018 presidential election in Madagascar due to an increase in the price of an important export crop. A sharp spike in the global price of vanilla between 2015 and 2018 led to substantial gains in revenue and wealth for smallholder vanilla producers in Madagascar, the world’s largest vanilla exporter (Boone et al. 2026). Using precinct-level vote returns from the presidential elections before and after the shock, we examine the relative impacts on voter support for the incumbent president in the places that benefited from the price increase. Some features of this setting might lead us to expect a smaller vote response: the shock was driven by external events rather than domestic factors, and the wealth gains came from higher market-based earnings rather than government transfers. At the same time, the wealth gains were sizable and broadly distributed, and the president is the most prominent executive responsible for national policy, both of which could lead to larger effects on voting.

Much of the existing evidence on economic voting comes from long-established democracies (Figure 1). We know less about how voters respond in elections held under autocratic regimes or where transfers of power often happen outside of elections, which makes the expected effects in our setting harder to predict. Party institutionalization in Madagascar is also weak. Low levels of party attachment could lead to less partisan voters who are more responsive to economic conditions (Kayser and Wlezien 2011), or the volatile and fragmented party system could make it more difficult for voters to choose among alternatives (Anderson 2007).

Our results show that the increase in vanilla prices led to a substantial increase in electoral support for the incumbent president. Hery Rajaonarimampianina was first elected in 2013, prior to the run-up in vanilla prices, and then ran for re-election in 2018. Despite a broad collapse in popularity and electoral support overall, Rajaonarimampianina saw substantial increases in vote share in places benefiting from the vanilla boom. In the multi-candidate

first-round elections, he gained 25 percentage points in vanilla-producing regions relative to non-vanilla areas. This relative increase is attributable to an absolute gain of about 16 percentage points in vanilla areas between 2013 and 2018, along with a decline of about 9 percentage points elsewhere. As the overall third-place finisher in 2018, with less than 9% of the national vote share, he failed to qualify for the runoff election. Within the vanilla areas, however, he earned the second-highest vote share at 28%.

We provide additional evidence to support our analysis that the impacts on vote share are connected to the vanilla price. Besides comparing vanilla-producing communities to non-vanilla areas, we also exploit variation within the vanilla regions and show that the effects on vote share are increasing in several proxies for the intensity of vanilla production within the commune. We also examine support for other candidates to rule out that our effects are driven by differential changes in support for candidates from particular regions.

To help interpret the electoral impacts, we analyze the results from Afrobarometer surveys carried out before and after the vanilla price increase. On questions related to the overall direction of the country and perceptions of the economy, respondents in vanilla-growing communes show large and statistically significant increases compared to other respondents; an index related to economic perceptions increases by about 0.78 SD. In contrast, we see little effect on changes in political attitudes or support for political leaders. There is no significant improvement in assessments of government performance, and the estimated magnitude is significantly smaller than the change in perceptions of the economy. For some measures of government performance, specifically handling of health and education, we see significant declines in vanilla areas.

We also find no change in preferences for democracy or perceptions of the current extent of democracy, and no overall increase in approval or trust of political leaders. Some of these results are imprecisely estimated, however, and for certain estimates we are unable to rule out meaningful increases, notably including increases in approval and trust for the president, as well as increases in trust for the ruling party (for which the estimate is marginally significant).

In contrast, we see declines in approval for local municipal councilors and members of the national assembly, both of which are significantly lower than approval for the president. These survey results suggest that our voting results may reflect an increase in support for the president in particular, rather than a general increase in support for all incumbent political leaders.

Our paper contributes to the broader literature on economic voting, including the strand of this literature examining the electoral impacts of resource booms and fluctuations in commodity prices. Much of the existing work on resource booms in developing countries identifies political effects driven by public spending, patronage, or rent-seeking (Brollo et al. 2013; Carreri and Dube 2017; Asher and Novosad 2023; Paler et al. 2023). We show how income gains attributable to higher market-based earnings lead to substantial gains in vote share for the national political leader. Vanilla production in Madagascar is distributed across many smallholder producers who sell their output to private traders, and the price increase led to large increases in household wealth for a large portion of households in vanilla-producing communities (Boone et al. 2026). In this respect, our results appear similar to two studies of local elections in Brazil, where increases in crop prices (Novaes and Schiumerini 2022) and local farm incomes (Cícero and Goes 2026) lead to higher re-election probabilities for incumbent mayors; in both cases, the results appear to be driven by changes in local income rather than fiscal spending or patronage. Our paper uses sub-national election data, but studies the effects for a national-level presidential election. We also find that approval ratings for the president are significantly higher than for local officials, suggesting that in our setting, the political impacts may be loading on the national executive instead of local government.¹

¹Novaes and Schiumerini (2022) focus on mayoral elections in part because local officials in their setting have few policy options for addressing the shock, allowing them to look for evidence of irrationality or misattribution on the part of voters. We examine the impacts for a national election, where political leaders have a greater ability to influence how economic shocks affect voters. While our setting does not provide a clean test of whether voters respond to “luck,” our results do show that changes in commodity prices can have substantial impacts on electoral outcomes for national political figures, which can influence their incentives to pursue different policies.

By combining our data on vote returns with survey-based measures, we are also able to examine potential explanations for the shift in electoral support. While we observe large impacts on voting, we see little change in political attitudes. There is no increase in overall levels of trust in political leaders and institutions and no change in individual attitudes towards democracy. In his review of the broader literature, Margalit (2019) notes that studies commonly find impacts on political attitudes, while effects on voting outcomes are less consistent. In contrast, our results are closer to those of Bagues and Esteve-Volart (2016), who find that concentrated lottery winnings in a region affect voting outcomes but not people’s assessments of the government or opposition.² The lack of improvement in assessments of government performance could indicate that voters are not (mis)attributing the windfall to the president’s actions. Instead, the increase in economic well-being may cause voters to be more satisfied with the status quo, which is the interpretation provided by Bagues and Esteve-Volart (2016). Unlike Bagues and Esteve-Volart (2016), our voting results are accompanied by substantial increases in people’s overall perceptions of the economy. These findings could also be consistent with some mood-related channels, though we find evidence against a general mood effect, given that for some groups, voters show declines in approval and increases in perceived corruption.

2 Political and Economic Context

To understand whether the vanilla shock led to changes in voting behavior, we study two consecutive first-round presidential elections, one before the price shock in October 2013, and one three years after the price shock, in November 2018. Figure 2a shows the price evolution of the global price of vanilla together with the timing of the presidential elections.

With a 75 percent poverty rate in 2022, Madagascar is one of the poorest countries in the world (Mulangu and Oviedo Silva 2024). Most of the population relies on agriculture and

²Many of these studies referenced by Margalit (2019) examine the effects of negative economic shocks (Martén 2019; Emmenegger et al. 2015; Margalit 2013; Algan et al. 2017), which is one possible explanation for the differences in findings.

specifically subsistence farming as their main source of livelihood, while cash crop production is one of the important income-generating activities. Madagascar is the largest vanilla exporter globally, accounting for 80 percent of the world’s vanilla crop. Vanilla in Madagascar is cultivated mostly by small-scale farming households, and because of strict agro-climatic requirements, it only grows in certain areas of the country, concentrated on the North Eastern coastal region (Figure 2b). Within these regions, vanilla cultivation is widespread, with a majority of rural households participating in production, and thus benefiting from the price increase (Boone et al. 2026).

The Malagasy democracy has been considered fragile, or a ‘moderate autocracy’ by the Democracy Matrix project (Lemm et al. 2021). Indeed, the 2013 elections were the first democratic elections after a coup d’état in 2009, where the last-elected president Marc Ravalomanana was ousted after political instability following mass protests. The mayor of the capital Antananarivo, Andry Rajoelina, seized power in the military-backed coup and formed an interim self-declared transitional government, which led to years of political impasse, while Ravalomanana fled to exile in South Africa (Ploch and Cook 2012). Finally, presidential and general elections were held at the end of 2013, from which both Rajoelina and Ravalomanana withdrew their candidature after facing pressure from the international community. None of the thirty-three candidates won over fifty percent of the vote in the first round of presidential elections. In the second round, held in December 2013, Hery Rajaonarimampianina gained 54 percent of the vote and was elected president over Jean Louis Robinson (International Crisis Group 2014).³

The next presidential elections in 2018 were considered the first democratic handover of political power in the country’s history (USAID 2022). In the first round of the elections, none of the candidates won more than half of the vote, and the sitting president, Hery Rajaonarimampianina, received only 8.8 percent of the vote, which did not qualify him for the second round. The former ousted president Ravalomanana gained 35 percent of the

³The former ousted president Ravalomanana supported Jean Louis Robinson, while Rajoelina supported Hery Rajaonarimampianina.

first round vote, and Rajoelina, who led the coup in 2009, gained 39 percent of the vote. Rajoelina was elected president in the second round with 56 percent of the vote (EU 2019).

3 Data and Empirical Specification

We use several datasets in our analysis. Each dataset contains geographic identifiers for the commune, which allows us to link information across datasets at the commune level.

Our main source of data is the precinct-level vote returns for the Madagascar presidential elections in 2013 and 2018. The data include the number of registered voters, the total number of votes cast, and the number of votes for each candidate. We use these to construct our two main outcomes of interest: the percentage of total votes cast in the precinct for Hery Rajaonarimampianina, who served as president from 2014 to 2018 and ran in both elections; and precinct-level turnout, defined as the fraction of registered voters who cast ballots. Because Rajaonarimampianina did not receive enough support in the first round in 2018 to advance to the runoff, our analysis compares the first-round results from 2013 to the first-round results from 2018.

The source for these data is the official election returns posted on the website of the High Constitutional Court of Madagascar. We scraped the returns from the web pages (for 2013) and PDF files (2018) for each commune. Returns are reported separately for each precinct within the commune. While we are able to link individual communes across the two elections, we do not have a consistent crosswalk allowing us to match precincts over time. Our final estimation sample links over 1500 communes across both elections, containing data from over 17,000 precincts in 2013 and over 22,000 precincts in 2018.

In addition to the electoral returns, we include data from several other sources. We use household- and resident-level data from the 2018 Madagascar General Census of Population and Housing. These data allow us to compute commune-level characteristics, including the fraction of households engaged in the cultivation of cash crops. We also use commune-level

information from the Commune Census of 2007, which was conducted by the National Center for Applied Research for Rural Development (FOFIFA) and the National Statistical Institute (INSTAT). These data contain rankings of the top 5 crops cultivated by households living in the commune; rankings are provided in terms of value as well as cultivated area.⁴

Finally, we use data from rounds 6 and 7 of the Afrobarometer surveys, which were carried out in Madagascar in 2015 and 2018, respectively. Hery Rajaonarimampianina was the incumbent president during both the 2015 and 2018 rounds, which straddle the rapid increase in vanilla prices. As a result, we are able to examine how respondents' political attitudes changed while holding the presidential administration fixed. The 2018 survey took place in January and February, prior to the presidential election later that year.

One limitation we face when analyzing the Afrobarometer data is the relatively small sample size. Our main estimation sample contains 1863 respondents, split roughly evenly across the two rounds. About 11% of respondents reside in vanilla-producing communes, corresponding to 104 in round 6 and 103 in round 7. To help limit the number of separate hypothesis tests and potentially increase power, we construct several index variables that combine the responses to multiple related questions. Most of the questions used to construct our indices use ordinal response scales; for example, the five possible responses to the respondent's perception of the country's economic conditions range from very bad (1) to very good (5). To aggregate several questions into a single index, we first convert the ordinal responses to the individual questions into z-scores, and then we average the respondent's z-score values across questions. To facilitate the interpretation of our estimates, we also standardize each of the indices using the mean and standard deviation of the non-vanilla respondents in the pre-treatment period.

To analyze the effects of the price increase on voting outcomes, we estimate the following

⁴See Boone et al. (2026) for additional information about these data.

difference-in-differences specification:

$$y_{icdt} = \beta_1 \text{Vanilla}_c \times \text{Post}_t + \gamma_c + \gamma_t + \varepsilon_{icdt} \quad (1)$$

where y_{icdt} represents the first-round vote share for Hery Rajaonarimampianina in precinct i located within commune c and district d during election year t . The variable Post_t equals 1 for the year 2018 and 0 for the year 2013. The equation includes commune and election-year fixed effects, and standard errors are clustered at the district level. The estimate for β_1 captures the relative change in vote share for the incumbent (Rajaonarimampianina) in vanilla communes compared to non-vanilla communes.

4 Voting Results

4.1 Presidential vote share in vanilla and non-vanilla communes

To study how the vanilla shock affected the vote share of the incumbent president, we first plot the distribution of vote shares at the precinct level for the 2013 and 2018 first round elections. Figure 3 shows the distribution separately for vanilla-producing and non-vanilla-producing communes, where we classify communes as vanilla-producing if vanilla is listed as one of the top 5 crops (by either value or area) in the 2007 commune census. The left panel shows how the distribution of the vote share for the incumbent president shifted to the left in non-vanilla communes. In these areas, the average Rajaonarimampianina vote share declines by 8.7 percentage points, falling from 17.6 percent in 2013 to 8.9 percent in 2018.

Within the vanilla communes, however, electoral support for the incumbent moves in the opposite direction. There is a large rightward shift in the distribution from 2013 to 2018, with the average vote share increasing by 16.1 percentage points, from 12.7 to 28.8 percent. As a result, in the 2018 election, Rajaonarimampianina receives the most votes of any candidate in 37.3 percent of precincts located in vanilla communes and wins an outright majority in 25.4

percent of precincts. By comparison, the corresponding figures for non-vanilla communes are 6.2 and 3.3 percent, respectively.⁵

Table 1 displays the results from estimating the difference-in-differences specification in Equation (1). Across all three columns, we regress the precinct-level Rajaonarimampianina vote share on commune-level indicators for vanilla production and fixed effects for commune and year. The table displays the coefficient estimates from the interaction between the vanilla variables and a Post indicator for the 2018 election. In column 1, we use the same “top 5” indicator from Figure 3 as the measure of commune-level vanilla production. On average, precincts in vanilla communes see a relative increase of 25 percentage points in the incumbent vote share between 2013 and 2018, compared to non-vanilla areas. This 25-point increase is very close to the relative difference of 24.8 percentage points ($= 16.1 + 8.7$) in the raw means from Figure 3.

4.2 Variation in exposure within vanilla areas

The results above suggest that the increase in vanilla prices led to substantial gains in electoral support for the incumbent president in places where people produced vanilla and benefited from the boom. An important threat to the validity of this interpretation is the possibility that other factors unrelated to the vanilla price may have changed within these areas around the same time. This concern is particularly relevant given that vanilla production is heavily concentrated within a particular geographic area of the country. One way to address this concern is by exploiting variation *within* the vanilla-producing region, instead of simply comparing vanilla to non-vanilla areas. If we had information on the fraction of households engaged in vanilla production, for example, we could see whether the impacts on voting are bigger in communes where more people cultivate vanilla. Unfortunately, there are no data available on the share of households engaged in vanilla production at the local level.

⁵In 2013, Rajaonarimampianina won a plurality of votes in 12.4% of precincts and a majority in 2.7% in vanilla communes; in non-vanilla communes, he won a plurality in 24.3% of precincts and a majority in 6.6%.

But we can construct several commune-level proxies for the intensity of vanilla cultivation, allowing us to test whether the estimated effects increase with the degree of exposure to the price shock.

First, in place of a single “top 5” indicator, we divide the vanilla communes into 3 groups based on the crop rankings from the 2007 commune census: communes where vanilla ranked as the most important crop (74 communes total); communes where vanilla ranked as the second most important crop (50); and communes where vanilla ranked third, fourth, or fifth (54).⁶ The results are displayed in column 2 of Table 1. The indicators for each of the three vanilla categories are interacted with the Post variable, and the omitted group remains the same group of non-vanilla communes as the previous column. Places where vanilla is ranked as the most important crop see the largest impact on incumbent vote share, with an increase of 39.5 percentage points relative to non-vanilla communes. We continue to see a sizable effect in places where vanilla is ranked second, but the magnitude is smaller at 27.7 percentage points. In communes where vanilla was ranked third through fifth, the estimate is much smaller (about 4 percentage points) and statistically indistinguishable from non-vanilla communes.

As a second test, we examine whether the estimated effects are related to the intensity of agricultural production. Within the vanilla-growing region, the share of households cultivating vanilla is likely to be larger in places where a greater share are engaged in agriculture. In column 3, we classify communes into three quantiles (terciles) based on the share of households engaged in agriculture (as reported in the 2007 commune census). We then interact these terciles with the “top 5” vanilla indicator. The results indicate that the impact on voting is increasing in the agricultural intensity of the commune. Vanilla-growing communes in the highest tercile are likely to have the highest fraction of households engaged in vanilla production; in these areas, we see an increase in vote share of 37.9 percentage points. As we move to lower terciles, the magnitude of the effect declines. In the lowest tercile, we continue

⁶Separate rankings were provided based on value and area; we use the highest rank from either list.

to see a positive effect of vanilla status on incumbent vote share, but the estimate of 15.4 percentage points is significantly smaller than the effect for the highest tercile.

Finally, we construct a third proxy for the intensity of vanilla cultivation, using the information on cash crops from the 2018 population census. In the 2018 census, all households were asked whether they cultivate any cash crops, and we use these data to compute the share of households in each commune that grow cash crops. There was no question about vanilla specifically, and since other types of cash crops are also grown in Madagascar (such as coffee, cloves, and cocoa), this measure is an imperfect proxy for vanilla cultivation.⁷ Despite this limitation, this variable has some advantages relative to the measures based on the 2007 commune census: it provides a continuous measure of exposure within the vanilla region; the information is also more recent, representing the year of the peak of the vanilla prices; and it is based on the national population census (as opposed to commune-level focus groups). As a result, this measure may be more representative of commune-level vanilla cultivation during the time of the price shock and subsequent presidential election.

Figure 4 displays the relationship between the precinct-level incumbent vote share and the fraction of households in the commune growing cash crops. We can see that there is little difference in 2013 in the Rajaonarimampianina vote share; if anything, the communities with a high fraction of households engaged in cash-crop production were slightly less likely to vote for Rajaonarimampianina than communities with a low share of cash-crop producers. However, in 2018, the communities with high shares of cash-crop producing households are much more likely to vote for the incumbent president, with a steeply increasing vote share at high intensities of cash-crop cultivating households. Across multiple measures for the intensity of vanilla production, we find a consistent pattern: in communes where vanilla cultivation is more important or prevalent, the relative increase in electoral support for the incumbent president is larger. This heterogeneity in the estimated effect lends support to

⁷Nonetheless, given the importance of vanilla as a cash crop in Madagascar, these measures are highly correlated. In Appendix Figure A1, we display the distribution of cash crop intensity separately for vanilla and non-vanilla communes.

the argument that the effects on voting are driven by a vanilla-related channel.

4.3 Turnout

In addition to looking at vote shares, we can use the same precinct-level vote returns to examine the effects on voter turnout for the first round of presidential elections. We estimate the same specifications from Table 1, replacing vote share with turnout as the dependent variable; the results are displayed in Appendix Table A1 and Figure A2. In contrast to the voting results, the estimated effects on turnout are substantially smaller in magnitude. If anything, turnout among registered voters appears to have decreased slightly (by 2.7 percentage points) in vanilla communes. While this estimate is statistically significant, some caution is warranted in interpreting the effect, since it appears to be driven by vanilla communes with the lowest levels of vanilla production.

Nonetheless, what our results do demonstrate is the possibility of sizable shifts in electoral support for a particular candidate coinciding with modest impacts on turnout. In trying to learn about voter behavior, turnout can be a particularly attractive object of analysis because, in contrast to vote choice, it is more easily observed at the individual level, including in large-scale administrative datasets. While turnout may be a good measure of political participation, our results suggest we should be cautious about using it to make inferences about support for incumbents.

5 Survey Evidence and Possible Interpretations

There may be multiple reasons why voters in vanilla regions increased their support for the incumbent after the price hike. We use the Afrobarometer surveys from 2015 and 2018 to examine how respondents' views of the economy, of government performance, and of particular political leaders changed in vanilla areas. These surveys straddle the run-up in vanilla prices but both take place during the same presidential administration, helping to control

for partisan differences and isolate the effects of changes in national or local circumstances. We restrict our attention to rural areas, which experience the largest economic gains from the price increase (Boone et al. 2026). We use the same vanilla indicator from column 1 of Table 1, namely, whether vanilla was reported as among the top 5 most important crops in the commune census.

5.1 Economy

We begin by showing results for the respondent’s perceptions of the country’s direction, the economy, and their own economic status in Panel A of Table 2. Each row displays the results from a separate regression for the listed outcome. One of the first questions respondents are asked is about their perceptions of the overall direction of the country, and specifically whether they think it is going in the “right direction” or the “wrong direction.” The results in row 1 indicate that respondents in vanilla communes are almost 23 percentage points more likely to report things are going in the right direction. This is a sizable increase relative to a base mean of 25% in non-vanilla communes in the initial round, and indicates a substantially higher degree of satisfaction with current circumstances.

For the remaining rows in the table, we combine multiple individual variables together into a single index; in rows 2 through 7, each index is standardized relative to the mean and standard deviation of non-vanilla areas in the pre-period.⁸ In row 2, we combine the responses to four questions about the respondent’s perceptions of their own economic conditions as well as the country’s economic conditions. A higher value represents a more positive assessment of economic conditions. We observe a positive and statistically significant effect, with respondents in vanilla areas showing a relative increase after the price shock of about 0.78 standard deviations. Row 3 shows a corresponding increase of about 0.53 standard deviations in an index measuring household ownership of four common assets.

⁸Separate results for the individual questions that make up the indices are displayed in Appendix Tables A2-A6.

5.2 Government performance and political leaders

The remaining rows in Table 2 display the results for several indices capturing different dimensions of political impacts. Panel B displays results for the respondents' assessments of government performance, based on 13 questions related to how well the government is handling various issues, such as the economy, creating jobs, and maintaining roads. Row 4 displays results for an overall index combining all 13 questions, while rows 4a–4c group the questions into 3 distinct groups using hierarchical cluster analysis. We find no evidence that respondents in vanilla areas rate government performance higher after the price shock. One of the measures even indicates a relative decline (based on two questions about government handling of health and education).

Next we examine a measure of trust in various leaders and governmental institutions. If the perceptions of the delivery, efficacy, or fairness of public institutions increased during the presidency in vanilla-growing communities, that could potentially explain the support for the government, which was in power during a period of such increased trust. In row 5 of Table 2, we see no significant effect on trust. We also see no significant effect on an index of government approval.

Turning to other perceptions of governance and democracy, we see a positive and marginally significant increase in perceived corruption, though this effect appears to be driven by increases for traditional leaders and business executives as opposed to the president or other government officials. When we look at attitudes towards democracy, we see no significant effects on either the demand for democracy or supply of democracy indices. The first measure is based on questions about the relative importance of democracy, while the second is based on questions about the current state of democracy. Despite the sizable effects on voting and on economic perceptions, the price shock does not appear to lead to an increase in overall support for democratic institutions.

6 Concluding Remarks

Why does the change in vanilla prices lead to such large effects on voting? The overall findings suggest that the effects on voting are driven by the increase in household earnings due to the higher crop prices. We see no evidence that the effects are driven by improvements in local infrastructure or government services, or by more positive assessments of government performance. Instead, the improvements in individual economic circumstances appear to lead to better perceptions about the overall economy. While the voting results show substantial positive effects on vote share for the incumbent, we see no significant increases in presidential approval or trust, though these estimates are imprecise. But the corresponding estimates for several other leaders and government institutions are significantly smaller than for the president, including approval ratings for the assembly member and local municipal leaders. Trust in the president in vanilla communes is also significantly higher compared to the national assembly, electoral commission, and local government. These results suggest that the increase in electoral support for the incumbent president may not necessarily translate to increases for other political leaders.

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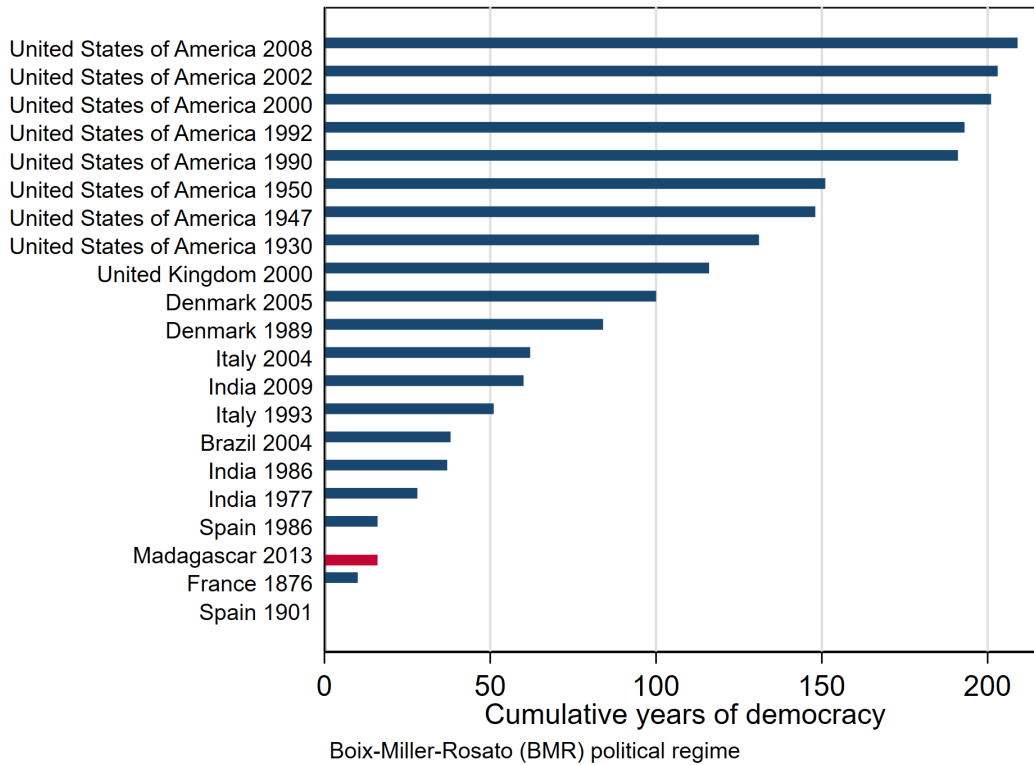
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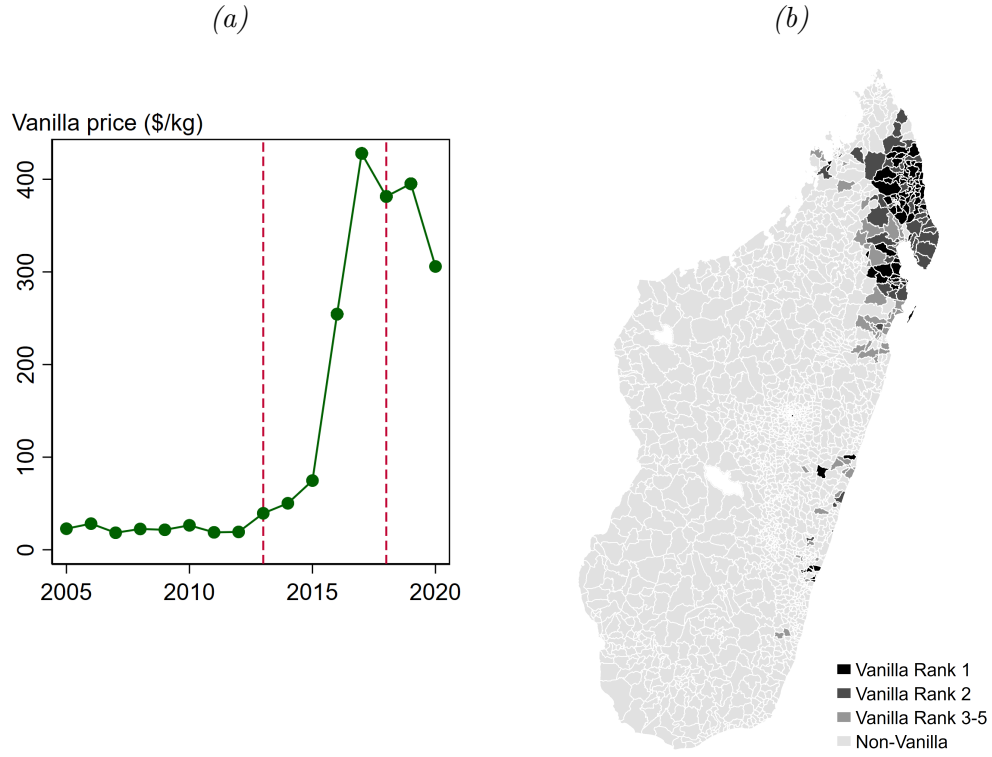
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Figure 1: Literature on economic voting and electoral outcomes: total years of democracy in the first year of election data by study



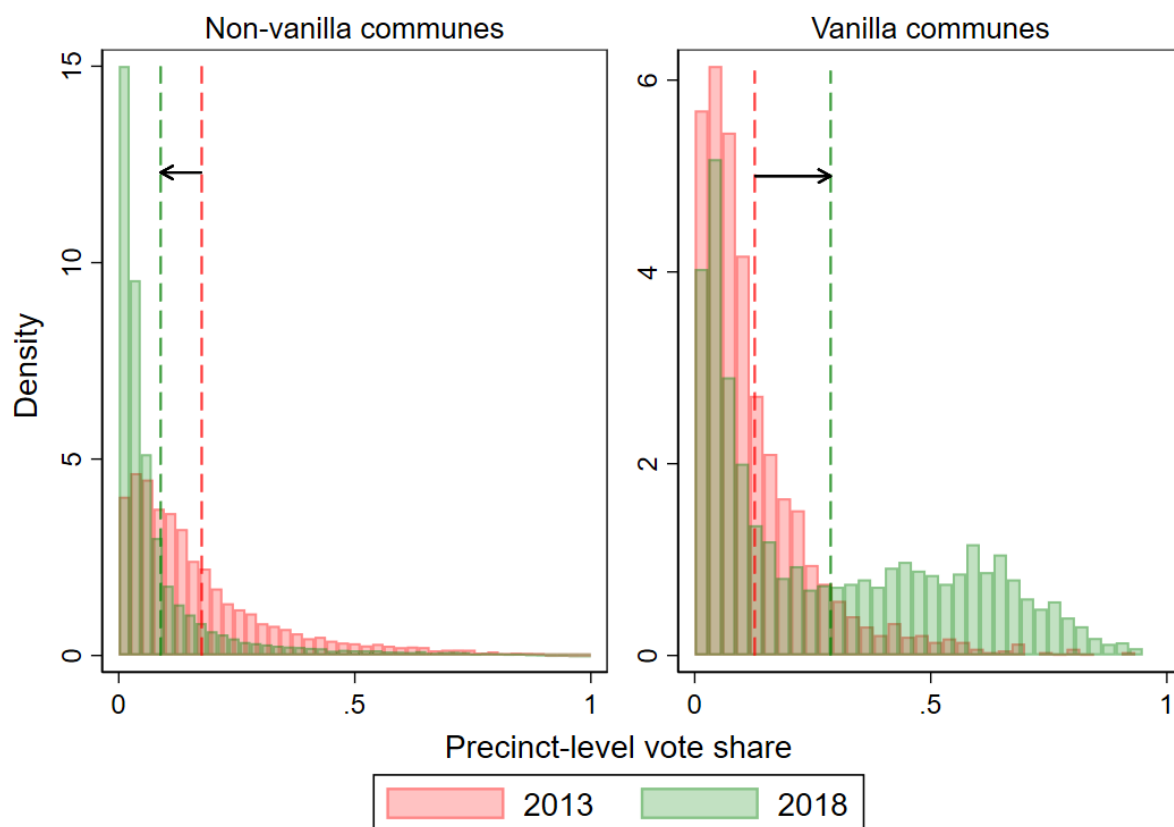
Notes: Each bar corresponds to a study in economics or political science on economic voting using election data. “Madagascar 2013” indicates this study, other country-year pairs refer to country-level studies published since the year 2000 as either a journal or a working paper publication. The x-axis displays the duration of democracy as defined by the Boix-Miller-Rosato (BMR) political regime variable in the Varieties of Democracy (V-Dem) dataset. This is an indicator variable for democracy, that classifies each country-year observation to democracy, non-democracy, or missing. The duration of democracy is calculated as the cumulative years a country has been classified a democracy in the first year of election data in that study. The cumulative duration variable sums over all past democratic regimes in the country.

Figure 2: Vanilla price and vanilla production in Madagascar



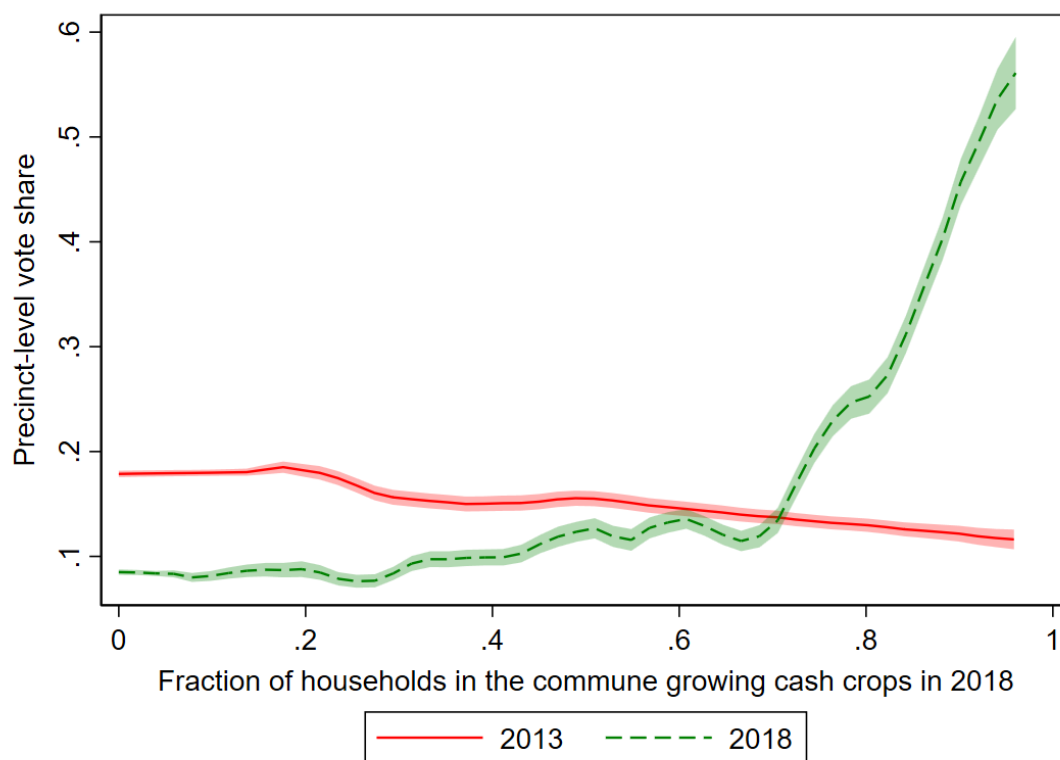
Notes: Panel (a) displays the average annual global price of vanilla over time; the dashed vertical lines indicate the presidential elections of 2013 and 2018 used in the analysis. Shaded regions in panel (b) indicate vanilla-producing communes in Madagascar as reported in the 2007 commune census.

Figure 3: Histograms of Rajaonarimampianina vote share in 2013 and 2018, by vanilla status



Notes: The dashed vertical lines indicate the (unweighted) mean precinct-level vote share for Rajaonarimampianina in the 2013 and 2018 first-round presidential elections. In non-vanilla-producing communes, the average precinct-level vote share for the incumbent president declines by 8.7 percentage points between 2013 and 2018; in vanilla-producing communes, the average vote share *increases* by 16.1 percentage points.

Figure 4: Precinct-level Rajaonarimampianina vote share vs. commune-level cash crop cultivation



Notes: Local polynomial smooth plots of precinct-level Rajaonarimampianina vote share vs. the commune-level fraction of households cultivating cash crops. The solid red line is from the 2013 first-round presidential election (prior to the vanilla price increase); the dashed green line is from the 2018 first-round presidential election (after the vanilla price increase). The fraction of households cultivating cash crops comes from the 2018 population census.

Table 1: Precinct-level Rajaonarimampianina vote share vs. vanilla commune status

	(1)	(2)	(3)
Vanilla (top 5) $\times$ post	0.250*** (0.0698)		
Vanilla (rank 1) $\times$ post		0.395*** (0.0700)	
Vanilla (rank 2) $\times$ post		0.277*** (0.0483)	
Vanilla (rank 3-5) $\times$ post		0.0420 (0.0523)	
Lowest ag tercile $\times$ vanilla (top 5) $\times$ post			0.154*** (0.0551)
Middle ag tercile $\times$ vanilla (top 5) $\times$ post			0.253*** (0.0942)
Highest ag tercile $\times$ vanilla (top 5) $\times$ post			0.379*** (0.0754)
Observations	40388	40388	40388
Number of communes	1617	1617	1617
Commune FE	Y	Y	Y

Notes: Precinct-level vote returns from the 2013 and 2018 first-round presidential elections. The dependent variable is the precinct-level Rajaonarimampianina vote share. “Vanilla (top 5)” is an indicator for whether vanilla was reported as among the top 5 crops in the 2007 commune census, either in terms of overall value or area, and “post” is an indicator for the 2018 election. In column 2, we divide the vanilla-top-5 communes into 3 groups based on the highest ranking (by value or area). In column 3, we divide communes into 3 quantiles (terciles) based on the percentage of people reported to be working in agriculture in the commune census and interact the tercile indicators with vanilla status. All specifications include commune and year fixed effects. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Afrobarometer survey responses

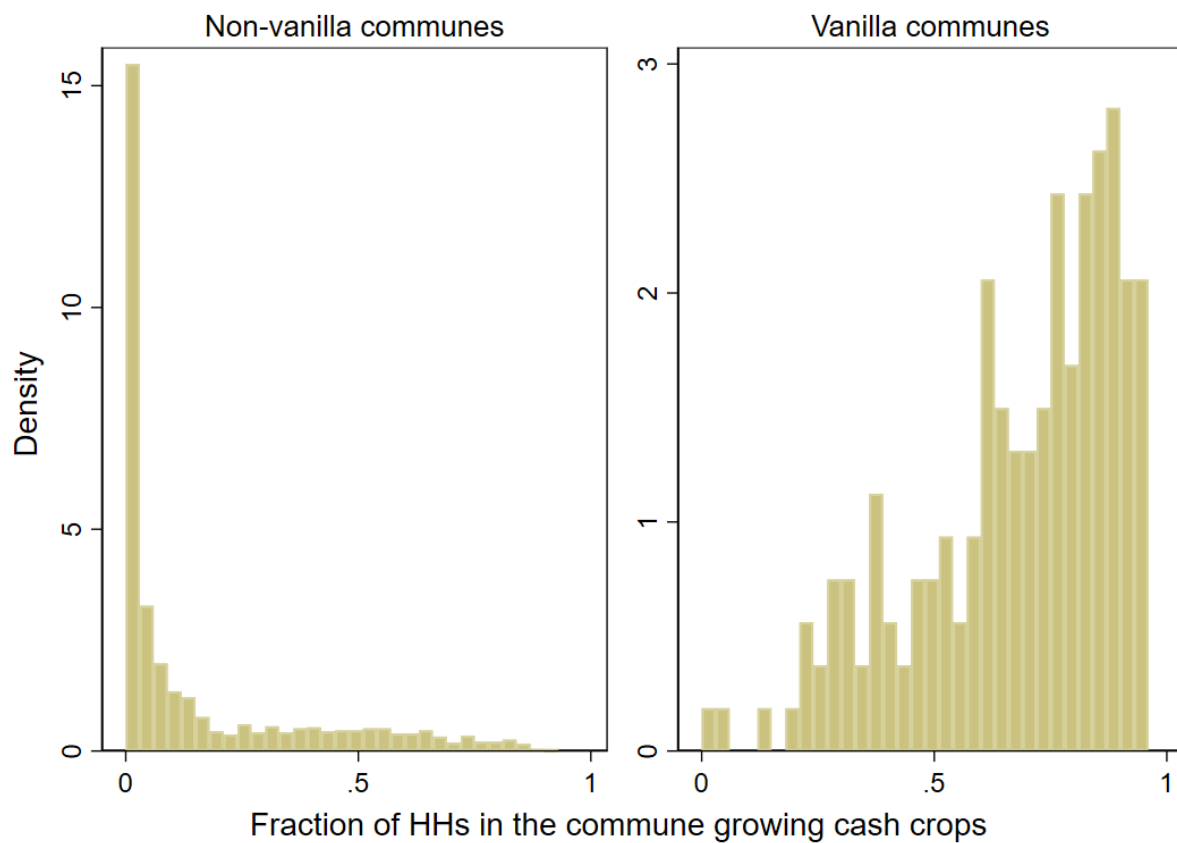
	(1) Vanilla commune × post	N
<i>Panel A: Overall perceptions and economic outcomes</i>		
1. Country going in right direction	0.227** (0.0901)	1851
2. Economic perceptions index	0.776** (0.351)	1863
3. Asset index	0.529*** (0.167)	1861
<i>Panel B: Government performance index</i>		
4. Current govt handling: All items (13)	-0.136 (0.197)	1863
4a. Economic management (5)	-0.0381 (0.312)	1863
4b. Infrastructure & food security (4)	0.135 (0.153)	1863
4c. Health and education (2)	-0.853*** (0.159)	1861
<i>Panel C: Perceptions of leaders and views on democracy</i>		
5. Trust index	0.153 (0.159)	1863
6. Approval index	-0.0697 (0.176)	1862
7. Corruption index	0.427* (0.237)	1848
8. Demand for democracy	-0.229 (0.215)	1856
9. Supply of democracy	0.0279 (0.108)	1862

Notes: Afrobarometer surveys from 2015 and 2018; rural sample only. Each row represents a separate regression and lists the dependent variable along with the estimated coefficient on the Vanilla commune × post interaction. “Vanilla communes” are those reporting vanilla among the top 5 crops, and “post” is an indicator for the 2018 survey. Row 1: The dependent variable is an indicator for whether the respondent thinks the country is going in the right direction (vs. wrong direction) overall. Rows 2-7: The dependent variable is a composite z-score index aggregating responses across multiple questions; coefficient magnitudes can be interpreted as standard deviations of the control group. Rows 8-9: The dependent variables are indices commonly constructed by Afrobarometer, which take values ranging between 0-4 (demand) or 0-2 (supply). See Tables A2-A6 for the questions included in each index. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Online Appendix for:
Economic voting in a fragile democracy:
Evidence from presidential elections in Madagascar

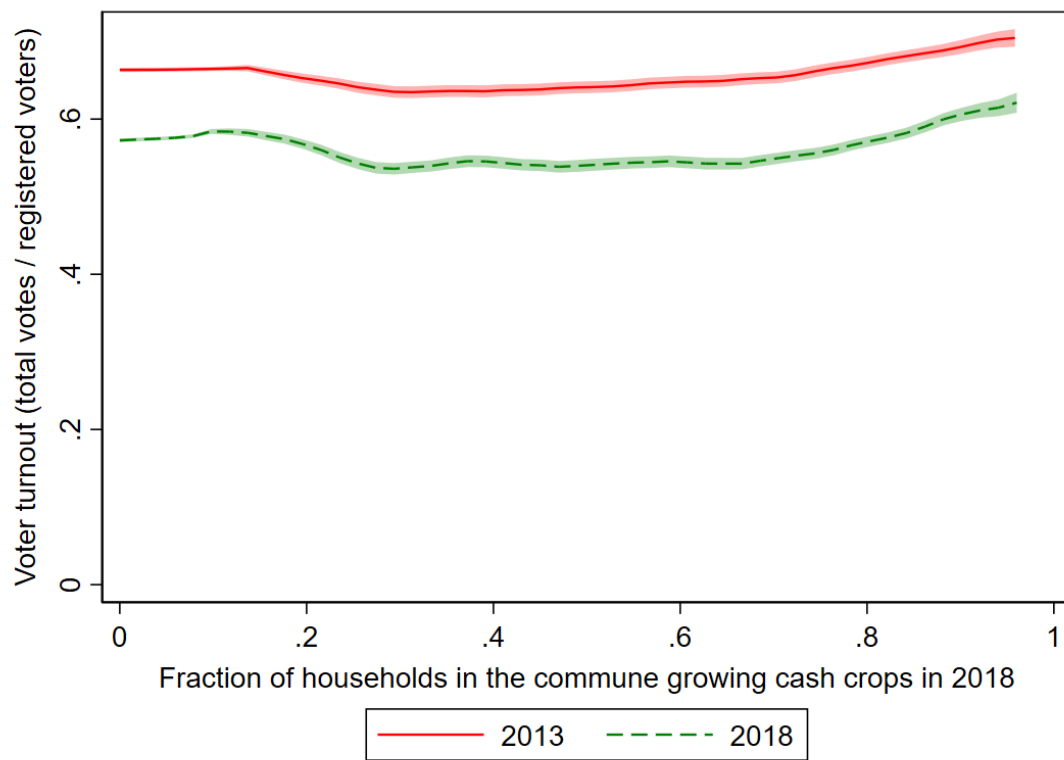
A Additional Figures and Tables

Figure A1: Histograms of commune-level fraction of households engaged in cash crop cultivation



Notes: For each commune, the fraction of households growing cash crops is computed from the 2018 census of population and housing. “Vanilla communes” are those reporting vanilla among the top 5 crops in the 2007 commune census. Separate histograms are shown for the 1439 non-vanilla and 178 vanilla communes.

Figure A2: Precinct-level voter turnout vs. commune-level cash crop cultivation



Notes: Local polynomial smooth plots of precinct-level voter turnout vs. the commune-level fraction of households cultivating cash crops. Except for the dependent variable, the specifications are otherwise identical to Figure 4.

Table A1: Voter turnout vs. vanilla

	(1)	(2)	(3)
Vanilla (top 5) $\times$ post	-0.0274*** (0.00938)		
Vanilla (rank 1) $\times$ post		-0.0215 (0.0144)	
Vanilla (rank 2) $\times$ post		-0.0224** (0.00953)	
Vanilla (rank 3-5) $\times$ post		-0.0393*** (0.00894)	
Lowest ag tercile $\times$ vanilla (top 5) $\times$ post			-0.0266*** (0.00652)
Middle ag tercile $\times$ vanilla (top 5) $\times$ post			-0.0462** (0.0193)
Highest ag tercile $\times$ vanilla (top 5) $\times$ post			-0.0178* (0.0101)
Observations	40535	40535	40535
Number of communes	1617	1617	1617
Commune FE	Y	Y	Y

Notes: Precinct-level vote returns from the 2013 and 2018 first-round presidential elections. The dependent variable is the precinct-level voter turnout rate. The specifications are otherwise identical to those from Table 1; see notes to that table for additional information. All specifications include commune and year fixed effects. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Perceptions of economic conditions: Individual questions

	Country's economic condition ...			
	(1) Country's present economic condition	(2) Your present living conditions	(3) ... compared to 12 months ago	(4) ... in 12 months time
Vanilla commune $\times$ post	0.734** (0.316)	0.435** (0.190)	0.532** (0.243)	0.216 (0.273)
Mean of Dep. Var.	2.29	2.36	2.56	2.81
Observations	1859	1863	1855	1760

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The dependent variable takes integer values from 1 to 5 and is included in the regression as a continuous measure. For columns 1 and 2, responses include *very bad*, *fairly bad*, *neither good nor bad*, *fairly good*, and *very good*. For columns 3 and 4, responses include *much worse*, *worse*, *same*, *better*, and *much better*. Vanilla communes are those reporting vanilla among the top 5 crops. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3: Views on government handling of various matters: Individual questions

	(1) Vanilla commune × post	Mean of dep var	N
<i>Group 1: Economic management</i>			
1. Managing the economy	0.176 (0.224)	0.90	1848
2. Improving living standards of the poor	-0.0395 (0.199)	0.74	1850
3. Creating jobs	-0.189** (0.0813)	0.81	1844
4. Keeping prices down	-0.0201 (0.159)	0.81	1858
5. Narrowing income gaps	-0.0233 (0.171)	0.70	1854
<i>Group 2: Infrastructure and food security</i>			
6. Providing water and sanitation services	0.381 (0.264)	0.88	1850
7. Ensuring enough to eat	-0.0247 (0.136)	0.76	1861
8. Maintaining roads and bridges	-0.0572 (0.263)	0.82	1860
9. Providing reliable electric supply	0.0174 (0.0811)	0.59	1851
<i>Group 3: Health and education</i>			
10. Improving basic health services	-0.460** (0.180)	1.16	1854
11. Addressing educational needs	-0.597*** (0.188)	1.18	1854
<i>Additional items</i>			
12. Reducing crime	0.113 (0.191)	1.03	1849
13. Fighting corruption	-0.0336 (0.140)	0.71	1776

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The respondent is asked “how well or badly the current government is handling” each of the areas listed in the table. Each row reports the results from a separate regression using the dependent variable shown. Each dependent variable takes integer values from 0 to 3 (very badly, fairly badly, fairly well, very well) and is included in the regression as a continuous measure. Vanilla communes are those reporting vanilla among the top 5 crops. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Trust in government: Individual questions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	President	Parliament	Electoral commission	Local government	Ruling party	Opposition party	Police	Courts
Vanilla commune $\times$ post	0.371 (0.230)	-0.0442 (0.148)	-0.226* (0.122)	-0.0897 (0.143)	0.372* (0.204)	0.215 (0.228)	0.307* (0.160)	0.0397 (0.201)
Mean of Dep. Var.	1.47	1.28	1.50	1.87	1.00	0.91	1.20	0.96
Observations	1828	1788	1776	1840	1762	1743	1850	1824

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The dependent variable takes integer values from 0 to 3 and is included in the regression as a continuous measure. For each of the people or organizations listed, the respondent is asked, “How much do you trust each of the following, or haven’t you heard enough about them to say?” The dependent variable is coded as follows: 0 = *Not at all*, 1 = *Just a little*, 2 = *Somewhat*, and 3 = *A lot*; we exclude people who respond *Don’t know* / *Haven’t heard enough* or refuse to answer. Vanilla communes are those reporting vanilla among the top 5 crops. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Approval of political leaders: Individual questions

	(1)	(2)	(3)	(4)
	President	Assembly Member	Municipal Councilor	Traditional leader
Vanilla commune $\times$ post	0.307 (0.221)	-0.272* (0.137)	-0.182** (0.0777)	0.0477 (0.119)
Mean of Dep. Var.	1.27	1.21	1.76	2.12
Observations	1832	1824	1844	1759

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The dependent variable takes integer values from 0 to 3 and is included in the regression as a continuous measure. For each question, the respondent is asked, “Do you approve or disapprove of the way the following people have performed their jobs over the past twelve months, or haven’t you heard enough about them to say?” Responses are coded as follows: 0 = *Strongly Disapprove*, 1 = *Disapprove*, 2 = *Approve*, and 3 = *Strongly Approve*; we exclude people who respond *Don’t know / Haven’t heard enough* or refuse to answer. Vanilla communes are those reporting vanilla among the top 5 crops. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Views on corruption: Individual questions

	(1) Office of Presidency	(2) Members of Parliament	(3) Govt officials	(4) Local govt	(5) Police	(6) Judges	(7) Traditional leaders	(8) Religious leaders	(9) Business executives
Vanilla commune $\times$ post	-0.214 (0.288)	0.272 (0.196)	0.184 (0.199)	0.0890 (0.138)	0.0122 (0.167)	-0.0118 (0.270)	0.397*** (0.0954)	0.250** (0.122)	0.813*** (0.166)
Mean of Dep. Var.	1.09	1.25	1.25	0.73	1.48	1.46	0.37	0.35	1.25
Observations	1724	1730	1709	1792	1819	1765	1737	1798	1667

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The dependent variable takes integer values from 0 to 3 and is included in the regression as a continuous measure. For each group of people, the respondent is asked, “How many of the following people do you think are involved in corruption, or haven’t you heard enough about them to say?” Responses are coded as follows: 0 = *None*, 1 = *Some of them*, 2 = *Most of them*, and 3 = *All of them*; we exclude people who respond *Don’t know* / *Haven’t heard enough* or refuse to answer. Vanilla communes are those reporting vanilla among the top 5 crops. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: Compare effects on perceptions of economic conditions vs. perceptions of government and governance

	(1)
<i>Base coefficient:</i>	
Economic perceptions index	0.776** (0.351)
<i>Other outcomes vs. economic perceptions:</i>	
Overall handling index	-0.912*** (0.271)
Handling 1: Economic management	-0.814*** (0.203)
Handling 2: Infrastructure & food security	-0.642 (0.420)
Handling 3: Health & education	-1.629*** (0.404)
Trust index	-0.623** (0.313)
Approval index	-0.846*** (0.256)
Corruption index	-0.349 (0.397)

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The table reports tests for differences in the coefficient estimates from Table 2. The first row reports the coefficient estimate for the “Economic perceptions index”. Subsequent rows report the difference between the coefficient estimate for the indicated variable and the coefficient on economic perceptions. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Compare perceptions of country’s economic conditions vs. government handling managing the economy

	(1) z-score	(2) binary
<i>Base coefficient:</i>		
Country’s present economic conditions	0.809** (0.349)	0.329** (0.131)
<i>Other outcomes vs. economic conditions:</i>		
Government handling of managing the economy	-0.532** (0.225)	-0.283*** (0.0964)
Approval of president’s performance	-0.423** (0.199)	-0.203** (0.0971)
Trust president	-0.460** (0.204)	-0.233*** (0.0844)

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The table tests for differences in the coefficient estimates (on vanilla $\times$ post) for different dependent variables, each of which corresponds to a single question in the Afrobarometer survey (not a composite index). In the column 1, the set of responses for each question is converted to a z-score by standardizing the responses relative to the mean and standard deviation of the non-vanilla areas in 2015. In column 2, each dependent variable takes a value of 0 or 1, coded as follows: “Country’s present economic conditions” equals 0 for *very bad* and *fairly bad*, and equals 1 for *neither good nor bad*, *fairly good*, and *very good*; “Government handling of managing the economy” equals 0 for *very badly*, and equals 1 for *fairly badly*, *fairly well*, and *very well*; “Approval of president’s performance” equals 0 for *strongly disapprove* and *disapprove*, and equals 1 for *approve* and *strongly approve*; and “Trust president” equals 0 for *not at all* and *just a little*, and equals 1 for *somewhat* and *a lot*. The first row reports the estimated impact on the respondent’s assessment of the country’s present economic conditions; this specification corresponds to the one in column 1 of Table A2 except that the dependent variable is coded differently. Subsequent rows report the difference between the coefficient estimate for the indicated outcome and the coefficient on the base outcome. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Compare approval of president vs. other leaders

	(1) z-score	(2) binary
<i>Base coefficient:</i>		
Approve of president's performance	0.387 (0.279)	0.126 (0.102)
<i>Approve of performance of others vs. president:</i>		
Member of national assembly	-0.760*** (0.197)	-0.330*** (0.0842)
Municipal councilor	-0.659** (0.254)	-0.395*** (0.110)
Traditional leader	-0.311 (0.394)	0.00859 (0.164)

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The table tests for differences in the coefficient estimates (on vanilla $\times$ post) for different outcome variables, each of which corresponds to a single question in the Afrobarometer survey. See notes to Table A8 for additional information. The binary outcomes for president, assembly member, and municipal councilor are coded the same as presidential approval in Table A8; for traditional leaders, the binary outcome equals 1 for *strongly approve* and 0 otherwise. The specifications in row 1 corresponds to column 1 of Table A5, except that the dependent variable is coded differently. Subsequent rows report the difference between the coefficient estimate for the indicated outcome and the coefficient on the base outcome. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A10: Compare trust in president vs. other leaders

	(1) z-score	(2) binary
<i>Base coefficient:</i>		
Trust in president	0.350 (0.217)	0.0967 (0.0970)
<i>Other outcomes vs. trust in president:</i>		
Trust in national assembly	-0.395** (0.159)	-0.159*** (0.0558)
Trust in electoral commission	-0.596*** (0.180)	-0.216*** (0.0496)
Trust in local government	-0.448*** (0.169)	-0.189** (0.0864)
Trust in ruling party	0.0660 (0.126)	0.0529 (0.0960)
Trust in opposition party	-0.0995 (0.400)	-0.0177 (0.167)
Trust in police	-0.0488 (0.201)	0.0800 (0.0725)
Trust in army	-0.0637 (0.231)	0.0682 (0.0754)
Trust in courts	-0.308 (0.202)	-0.112 (0.0869)
Trust in traditional leaders	-0.386 (0.280)	-0.123 (0.159)
Trust in religious leaders	-0.472 (0.391)	-0.137 (0.194)

Notes: Data are from the 2015 and 2018 rounds of the Afrobarometer survey; rural sample only. The table tests for differences in the coefficient estimates (on vanilla $\times$ post) for different outcome variables, each of which corresponds to a single question in the Afrobarometer survey. See notes to Table A8 for additional information. For traditional leaders and religious leaders, the binary outcome equals 1 for *a lot* and 0 otherwise; all other outcomes are coded the same as “Trust president” in Table A8. The specifications in row 1 corresponds to column 1 of Table A4, except that the dependent variable is coded differently. Subsequent rows report the difference between the coefficient estimate for the indicated outcome and the coefficient on the base outcome. All specifications include region and wave fixed effects, as well as controls for age and gender of respondent. Robust standard errors in parentheses, adjusted for clustering at the district level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.