

## Agricultural Mechanization, Moore's Thesis, and Rural Elites' Attitudes toward Democracy in Asia

David J. Samuels and Henry Thomson

### Abstract

Conventional wisdom assumes that rural elites oppose democratization. However, because agricultural mechanization reduces farmers' demand for labor, it also reduces their need for autocratic coercion to control the supply, mobility, and price of agricultural workers. That is, the adoption of labor-saving technology can alter agrarian elites' political preferences. Specifically, farmers who have mechanized production should be relatively favorable toward democracy compared to those who have not. We test this proposition at the individual level using Asia Barometer surveys in eight East and Southeast Asian countries that include questions about both attitudes toward democracy and agricultural machinery ownership. Results support our main claim that tractor-owning farmers are more supportive of democracy than their non-tractor-owning counterparts. Mechanization is also associated with greater support for the proposition that democracy should entail investment in public goods that foster employment opportunities. These results provide insight into how technological change could challenge longstanding assumptions about the political preferences of rural elites around the world.

**Keywords:** Agriculture, democracy, democratization, mechanization, rural elites.

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Scholarship on regime change has long assumed that rural elites are among the most ardent supporters of authoritarian rule and opponents of democratization.<sup>1</sup>

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<sup>1</sup> Barrington Moore, *Social Origins of Dictatorship and Democracy: Lord and Peasant in the Making of the Modern World* (Boston: Beacon Press, 1966); Dietrich Rueschemeyer, Evelyne Huber Stephens, and John D. Stephens, *Capitalist Development and Democracy* (New York: Polity Press, 1992); Barbara Geddes, *Paradigms and Sand Castles: Theory Building and Research Design in Comparative Politics* (Ann Arbor: University of Michigan Press, 2003); and James Mahoney, *Knowledge Accumulation in Comparative Historical Research* (New York: Cambridge University Press, 2003).

Whether they fear rising wages, labor mobility, or land redistribution, these actors historically have supported political systems that repress agricultural workers' interests. Cross-national research as well as in-depth case studies have provided consistent support for this notion.<sup>2</sup>

Such investigative approaches all assume that agrarian elites' political preferences are constant over time. Given this, they emphasize that what matters for regime change outcomes is the relative balance of political forces, in particular, whether proponents of democracy such as the bourgeoisie and working class are more numerous and have sufficient resources to overwhelm the opposition of rural elites' organizational strength and deep pockets.

The assumption of constant preferences implies a view that the nature of agricultural production does not change over time—that the capital/labor ratio remains constant and that there are no productivity gains to technological innovation. For most of human history, this was an easy assumption to make, and to accept. After all, only after the spread of mechanization in the second half of the twentieth century did the labor-dependence of agriculture decline rapidly and its productivity dramatically increase.

What happens to the political preferences of labor-dependent agrarian elites when mechanization obviates the need to repress rural labor—by reducing the demand for rural labor itself? As machines replace human workers and landowners no longer need to politically control labor, their opposition to democracy should decline. Technological change—in the form of agricultural mechanization—should alter rural elites' calculus about the relative costs and benefits of democracy and dictatorship. That is, technological change can reshape elites' political preferences. Mechanization transforms agricultural production from a system heavily dependent on human labor to one largely free of it, removing farmers' need to repress workers and thereby eliminating their economic incentives to support autocracy. Given this, at the national level and through time we observe a connection between mechanization and democratization.<sup>3</sup>

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<sup>2</sup> Carles Boix, *Democracy and Redistribution* (New York: Cambridge University Press, 2003); Daniel Ziblatt, "Does Landholding Inequality Block Democratization?" *World Politics* 60, no. 2 (2008): 610-641; id., "Shaping Democratic Practice and the Causes of Electoral Fraud: The Case of Nineteenth-Century Germany," *American Political Science Review* 103, no. 1 (2009): 1-21; Ben Ansell and David J. Samuels, *Inequality and Democratization: An Elite Competition Approach* (New York: Cambridge University Press, 2014); Martin Ardanaz and Isabela Mares, "Labor Shortages, Rural Inequality, and Democratization," *Comparative Political Studies* 47, no. 12 (2014): 1639-1669; Henry Thomson, "Landholding Inequality, Political Strategy and Authoritarian Repression: Structure and Agency in Bismarck's 'Second Founding' of the German Empire," *Studies in Comparative International Development* 50, no. 1 (2015): 73-97; and Henry Thomson, *Food and Power: Regime Type, Agricultural Policy and Political Stability* (New York: Cambridge University Press, 2019).

<sup>3</sup> David J. Samuels and Henry Thomson, "Lord, Peasant... and Tractor? Agricultural Mechanization, Moore's Thesis, and the Emergence of Democracy," *Perspectives on Politics*, forthcoming, <https://doi.org/10.1017/S1537592720002303> (accessed March 19, 2021).

This essay builds on the above insight. Theoretically and empirically, we shift the level of analysis from state regime type to the individual farmer. We further elucidate and explore how agricultural mechanization reshapes rural elites' economic and political interests, particularly their need for a system of government that represses rural workers. Mechanized farm production reduces the need for a political system that keeps rural wages low and workers tied to the land. This logic should hold across geographical and historical contexts. Furthermore, agricultural mechanization reduces rural elites' opposition to investment in public goods, such as education, that is associated with democratization but gives workers exit options from hierarchical labor relations in the countryside.

Empirically, we analyze 2010–2012 Asia Barometer survey data from eight East and Southeast Asian countries to offer novel, direct evidence connecting agricultural mechanization to attitudinal variation among rural elites. We compare farmers' attitudes toward democracy to those of others, and then compare attitudes of farmers who own tractors against those who do not. We find that tractor-owning farmers are significantly more likely to support democracy, on average. We also find some evidence that tractor-owning farmers are more likely to view the provision of public goods promoting employment as an intrinsic part of democratic governance.

Our results support the notion that technological change that reduces demand for human labor in agriculture also reduces the affinity that Barrington Moore noted decades ago between landowning and autocracy—and offer a novel explanation for why scholars such as Carles Boix, Ben Ansell and David Samuels, and Michael Albertus have found that land inequality and “labor-repressive” agriculture are more weakly related to regime change in recent decades than in the past: because opposition to democracy may have attenuated among rural elites in countries that have undergone significant agricultural mechanization.<sup>4</sup>

In what follows, we explore the impact of technological change on rural elites' political preferences, and then derive hypotheses that can be tested using individual-level survey data. Subsequently, we present our research design, data, and results. We conclude by exploring the implications of our findings and by outlining potential avenues for future research.

## **Agricultural Mechanization and Rural Elites' Political Attitudes**

Although conventional political science wisdom assumes that individual landowners prefer a labor-repressive political system, no empirical work has

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<sup>4</sup> Moore, *Social Origins of Dictatorship and Democracy*; Boix, *Democracy and Redistribution*; Ansell and Samuels, *Inequality and Democratization*; and Michael Albertus, “Landowners and Democracy: The Social Origins of Democracy Reconsidered,” *World Politics* 69, no. 2 (2017): 233-276.

investigated rural elites' actual regime preferences, or how modernization in the countryside might reshape those preferences. Indeed, the most prominent research program on the relationship among modernization, cultural attitudes, and democratization focuses on mass, not elite, attitudes.<sup>5</sup> Empirically, the roots of this approach lie in Gabriel Almond and Sidney Verba's *Civic Culture*, which was the first to suggest that cross-national cultural variation can be plumbed by exploring individual attitudes as expressed in survey responses.<sup>6</sup> And, theoretically, in emphasizing the relationship between modernization and cultural self-expression values, Ronald Inglehart's framework is intellectually divorced from other versions of modernization theory that highlight the importance of economic self-interest for understanding regime change.<sup>7</sup>

For example, in his *Political Man*, Seymour Martin Lipset suggested that democracy emerges because modernization lowers the fear of redistribution among elites—as it also lowers the demand for redistribution among the poor.<sup>8</sup> Specifically, Lipset suggests that economic growth makes countries more receptive to democracy: “If there is enough wealth in the country so that it does not make too much difference whether some redistribution takes place, it is easier to accept the idea that it does not matter greatly which side is in power.”<sup>9</sup> Debate has ensued about whether democracy is or is not a function of economic development—with the focus shifting away from the impact of growth to the impact of the way that inequality evolves with growth to shape regime change.<sup>10</sup> Regardless, all of these versions of modernization theory either implicitly or explicitly assume that actors' economic self-interest—particularly their expectations about levels of taxation and redistribution—drive their calculations of the costs and benefits of fighting for or against regime change.

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<sup>5</sup> Ronald Inglehart, “How Solid Is Mass Support for Democracy: And How Can We Measure It?” *PS: Political Science and Politics* 36, no. 1 (2003): 51-57.

<sup>6</sup> Gabriel A. Almond and Sidney Verba, *The Civic Culture: Political Attitudes and Democracy in Five Nations* (Princeton, NJ: Princeton University Press, 1963).

<sup>7</sup> See also Bratton and Mattes, who suggest that voters support democracy more for its intrinsic value than its ability to deliver economic growth in Africa, and Chu et al., who argue that trust in institutions such as parties, parliament, and the courts is the main determinant of support for democracy. Michael Bratton and Robert Mattes, “Support for Democracy in Africa: Intrinsic or Instrumental?” *British Journal of Political Science* 31, no. 3 (2001): 447-474, and Yun-han Chu, Michael Bratton, Marta Lagos, Sandeep Shastri, and Mark Tessler, “Public Opinion and Democratic Legitimacy,” *Journal of Democracy* 19, no. 2 (2008): 75-87.

<sup>8</sup> Seymour Martin Lipset, *Political Man: The Social Bases of Politics* (New York: Doubleday, 1959).

<sup>9</sup> *Ibid.*, 51.

<sup>10</sup> Adam Przeworski, Michael E. Alvarez, Jose Antonio Cheibub, and Fernando Limongi, *Democracy and Development: Political Institutions and Well-Being in the World, 1950–1990* (New York: Cambridge University Press, 2000); Carles Boix and Susan Stokes, “Endogenous Democratization,” *World Politics* 55, no. 4 (2003): 517-519; Boix, *Democracy and Redistribution*; Ansell and Samuels, *Democracy and Inequality*; and Daron Acemoglu and James Robinson, *Economic Origins of Democracy and Dictatorship* (New York: Cambridge University Press, 2008).

Particularly for elites, assuming regime preferences derive from economic self-interest seems intuitively plausible. When considering the interests of agrarian elites specifically, it is useful to return to Moore’s famous argument that there is a strong affinity between labor-repressive agriculture and autocracy. For Moore, the chances for democratization depend on the relationship between “Lords” and “Peasants”—that is, in the canonical setting, between landowners and unskilled agricultural workers. In traditional agrarian societies, lords require peasants to work their land, while peasants depend on lords for security and welfare. This relationship is mutually beneficial, but hierarchical: to maintain their status, lords must prevent workers from slacking and keep them tied to the land to ensure an adequate supply of labor year in and year out.

Landowners’ economic interests shape their political preference for “labor-repressive” agriculture, and therefore for autocratic rule. Authoritarian governance represses rural labor by keeping rural workers tied to the land; failing to enforce equality before the law; allowing landowners to use violence to maintain local law and order; curtailing investment in public goods that could facilitate exit options for workers facing low wages in the countryside; and offering workers no government services that might substitute for a local patron’s employment and/or “good will” in providing minimal forms of social welfare. This authoritarian labor repression directly benefits landed elites’ economic welfare, by depressing wages and increasing farm profits.

Where labor repression in agriculture remains widespread even as a country at large modernizes, as in late nineteenth-century Germany, landowners will continue to prefer a political system that depresses agricultural wages—in a word, autocracy—regardless of the growth of a bourgeoisie or other prodemocratic urban and industrial interests.<sup>11</sup> However, the core logic of Moore’s argument applies more broadly to rural elites who employ labor, even outside the canonical setting of “lords and peasants.”<sup>12</sup> In modern market economies, farmers retain an interest in low rural wages to the extent that the agricultural production function still incorporates labor as a significant cost. Although their position in the social hierarchy may no longer resemble that of European feudal lords, present-day agrarian elites still have an interest in government interventions that reduce their costs and/or increase their profits, and this implies an interest in authoritarian rule and labor repression.<sup>13</sup>

By contrast, Moore’s “democratic” path to modernity requires the relationship between lord and peasant—or agrarian elites and rural labor—to change: essentially, it requires the disappearance of rural elites’ need to repress labor. Agricultural mechanization, and not industrialization or urbanization,

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<sup>11</sup> Alexander Gerschenkron, *Bread and Democracy in Germany* (Berkeley: University of California Press, 1943), and Ardanaz and Mares, “Labor Shortages.”

<sup>12</sup> Moore, *Social Origins of Dictatorship and Democracy*.

<sup>13</sup> Thomson, *Food and Power*.

severs this connection between labor-intensive agriculture and farmers' support for autocracy.<sup>14</sup> Holding all else constant, a mechanized farmer can achieve the same profitability with much less labor. Mechanization eliminates workers' jobs—but also eliminates elites' need to maintain a system of repressive labor relations. This is because with mechanization, the relative supply of labor no longer impacts the relative cost of repression, because the relative supply of labor becomes increasingly marginal to agricultural production itself. The need to coerce agricultural labor approaches zero as the demand for rural labor approaches zero—and the latter becomes likely the more that technology substitutes for labor in terms of relative contribution to agricultural output.

Rural elites' normative views about political equality need not change with mechanization. What does change is their instrumental need for coercive control over their workers. Mechanized farmers may not desire greater electoral competition, political participation, or secure property rights, but they no longer need the types of institutions associated with rural labor repression and authoritarian rule. Once technology eliminates this necessity, their political interests should also change—even if the relative distribution of land remains constant. Moreover, as mechanization advances, landowners have less to fear from rural labor, which is left in a weaker position, and they have less demand for labor-repressive policies that depress agricultural wages, keep workers tied to the land, and require use of coercion to reduce labor costs and maintain agricultural profitability.

A few scholars have suggested that Green Revolution technologies can have important political consequences. For example, Sabrin Beg and Aditya Dasgupta both find that the introduction of new high-yield seed varieties in Pakistan and India tends to undermine landlords' electoral dominance.<sup>15</sup> Likewise, Shreya Bhattacharya finds that, in India, mechanization leads to longer rural riots.<sup>16</sup> Because it reduces demand for agricultural labor and thus reduces farmers' demand for a labor-repressive political system, agricultural mechanization also should impact rural elites' attitudes toward democracy. This argument leads to the following hypothesis:

Hypothesis 1: Mechanized rural elites will be more supportive of democracy than nonmechanized rural elites, holding all else equal.

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<sup>14</sup> Samuels and Thomson, "Lord, Peasant... and Tractor?"

<sup>15</sup> Sabrin Beg, "Tenancy and Clientelism" (unpublished working paper, September 1, 2020), [https://www.dropbox.com/s/8ksdt51ac7th7qg/beg\\_democracy\\_july2020.pdf?dl=0](https://www.dropbox.com/s/8ksdt51ac7th7qg/beg_democracy_july2020.pdf?dl=0) (accessed March 19, 2021), and Aditya Dasgupta, "Technological Change and Political Turnover: The Democratizing Effects of the Green Revolution," *American Political Science Review* 112, no. 4 (2018): 918-938.

<sup>16</sup> Shreya Bhattacharya, "Technology in Agriculture and Religious Conflict" (paper presented at the 2019 meeting of the Midwest Political Science Association), [https://bhattacharya.github.io/MyWebsite/MPSA%20Submission\\_ShreyaB.pdf](https://bhattacharya.github.io/MyWebsite/MPSA%20Submission_ShreyaB.pdf) (accessed March 19, 2021).

Our argument can be extended with implications for rural elites' support for state investment in public goods associated with democracy, especially education that expands employment opportunities. In general, land has low complementarity with human capital, making rural employers relatively unresponsive to investment in education.<sup>17</sup> However, the adoption of novel agricultural technologies and production processes can significantly moderate this aversion. Mechanization increases demand for skilled rather than unskilled labor, and thus gives agrarian elites incentives to change the image of their polity to one safe for both capital *and* labor.<sup>18</sup> Mechanization should increase support among landowners for both democracy as well as investment in education, infrastructure, and other public goods, as part of an effort to attract and retain higher-quality labor. Furthermore, as mechanization proceeds and rural labor demand declines, agrarian elites could come to support investments in education that facilitate the exit of workers from the agricultural sector and reduce burdens on traditional institutions of patronage, good will, and poor relief.<sup>19</sup> Where nonmechanized rural elites want to keep workers tied to the land, their mechanized counterparts are less averse to exit options that facilitate rural-urban migration. This argument leads to the following hypothesis:

Hypothesis 2: Mechanized rural elites will associate democracy with investment in public goods more than nonmechanized rural elites, holding all else equal.

## Data

Researchers who wish to systematically compare the political attitudes of elites against others in society face a set of conceptual and methodological hurdles. First, “elite” is a vague term and members of elite groups are difficult to identify. Census forms do not ask whether one is “an elite” (in contrast to demographic characteristics such as gender or ethnicity, for example); typically do not contain questions about assets or wealth; and do not differentiate among the highest incomes in a way that would allow identification of actual economic elites. Given this, we know little about the population characteristics of elites and cannot define a representative sample of them. Second, even if one could define their population characteristics, elites are by nature few and reluctant to be interviewed about their wealth and/or their politics—and even if they agreed

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<sup>17</sup> Oded Galor, Omer Moav, and Dietrich Vollrath, “Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence,” *Review of Economic Studies* 76, no. 1 (2009): 143-179.

<sup>18</sup> Robert Mickey, *Paths Out of Dixie: The Democratization of Authoritarian Enclaves in the American South* (Princeton, NJ: Princeton University Press, 2015).

<sup>19</sup> James C. Scott, *Weapons of the Weak: Everyday Forms of Peasant Resistance* (New Haven, CT: Yale University Press, 1985).

to be interviewed, they may have incentives to dissimulate about the extent of their wealth and the nature of their politics. For these reasons and others, it is no surprise that there are few cross-national surveys of “elite political attitudes” that can be matched against the many available surveys of “mass political attitudes.”

As a specific class, rural elites are particularly elusive subjects for social science research. It is difficult to measure who owns, leases, or manages land in rural areas, even before the extent of landholdings are considered. Although land is an extremely important productive asset in developing countries, ownership of land and/or tenure rights are often opaque and poorly documented. They also can be held at the household or even community rather than the individual level, and unequally distributed by gender. As a result, identifying rural elites and soliciting information on their political attitudes entails additional problems on top of those that stymie research on wealthy elites, in general.

A further problem is that widely used cross-national surveys of mass political attitudes do not ask detailed questions about the positions of individuals concerning the rural economy or land ownership. The most recent waves of the World Values Surveys and the International Social Survey Program (ISSP) “Role of Government” module, for example, contain a grand total of zero questions about farming, agriculture, and agricultural interests. Likewise, the regional Latinobarometro and Afrobarometer surveys identify farmers, but do not ask questions about land ownership.<sup>20</sup> The ISSP asks respondents to consider the relative political influence of ten different groups such as business and the military, but “landowners” are not included as a possibility.

Finally, it should perhaps be no surprise that questions such as “Do you own a tractor?” are very rare on political attitudes surveys. We were pleasantly surprised to have found even one set of surveys that included such a question and that also asked about democracy: the third wave of the Asian Barometer survey (ABS) conducted in thirteen countries from 2010 through 2012.<sup>21</sup> The ABS is the largest cross-national political survey in Asia, covering East, Southeast, South, and Central Asia. It consists of nationally representative samples of at least eight hundred respondents in each country, except in China and India where only residents of large urban centers were included.

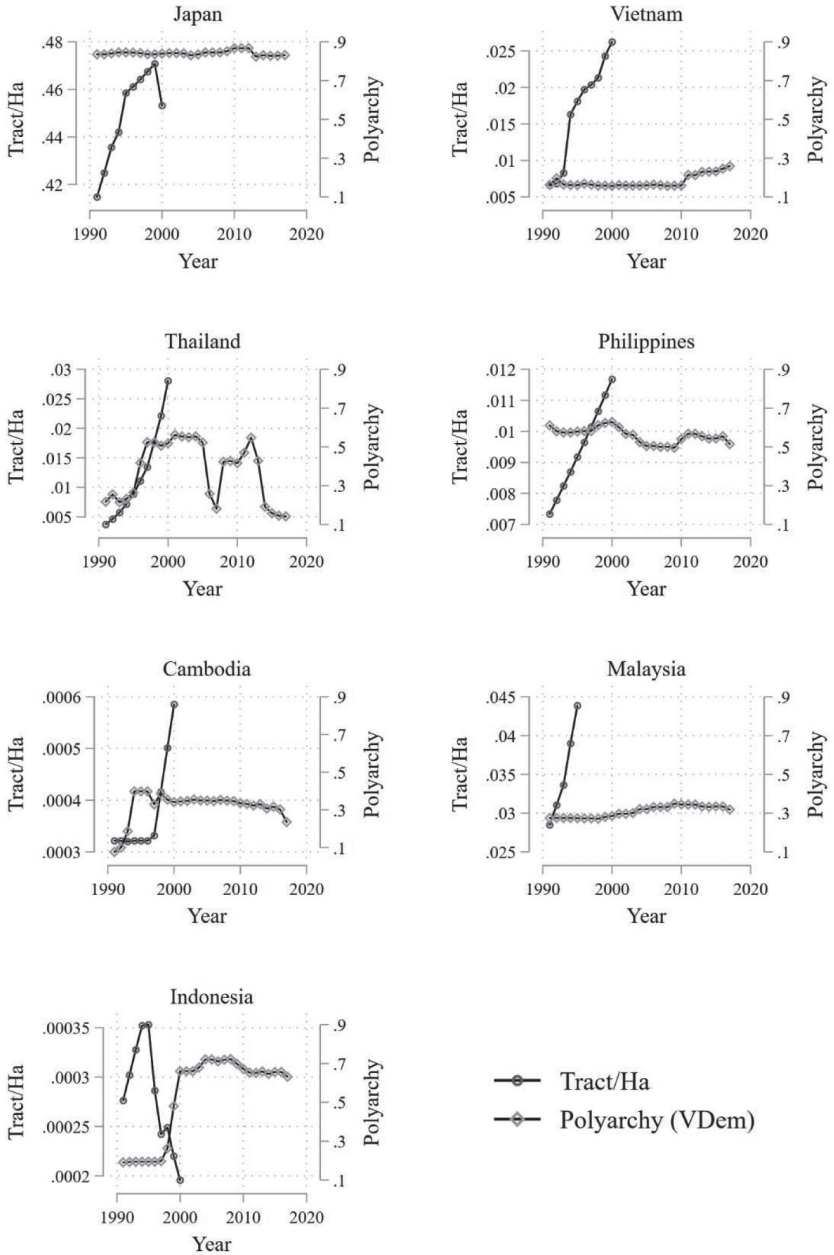
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<sup>20</sup> Some early waves of the Arab Barometer identify farmers who own land, but do not ask questions about tractor ownership that are essential for our present analysis.

<sup>21</sup> Hu Fu Center for East Asia Democratic Studies, “Asian Barometer Survey of Democracy, Governance and Development,” [http://www.asianbarometer.org/pdf/core\\_questionnaire\\_wave3.pdf](http://www.asianbarometer.org/pdf/core_questionnaire_wave3.pdf) (accessed March 19, 2021). Waves 2–4 of the ABS survey (2005–2008, 2010–2012, 2014–2016) all include a question on tractor ownership. However, the questions included in each wave differ slightly. ABS Waves 2 and 4 do not include comparable questions on occupation and democracy, respectively, that allow us to identify self-employed farmers and preferences for regime type. For this reason, our analysis includes data from only Wave 3 of the survey.



Figure 1. Agricultural Mechanization and VDem Polyarchy Indicator, Countries Included in Analysis



Survey questionnaires are developed and adapted to each national context with collaboration from local academics. The survey is conducted via face-to-face interviews in local languages.

The countries covered by the ABS vary in levels of economic development, degree of agricultural mechanization, and political regime type. In figure 1, we plot the number of tractors per hectare of arable land and the V-Dem Polyarchy indicator from 1990 through 2018 for each country included in our analysis.<sup>22</sup> Although no data on tractors are available after 2000, the degree of agricultural mechanization was increasing quickly from relatively low levels through the 1990s in all countries. One exception is Indonesia, where mechanization declined significantly after the Asian financial crisis and political upheaval in the late 1990s. The Polyarchy measure ranges from 0 to 1 and measures the extent to which electoral democracy is achieved in a country. The Asian countries included in our analysis represent wide variation on this measure in the early 2000s, from Japan where the measure remained above 0.80 for the entire period; through Thailand, where military coups in 2006 and 2014 led the measure to fluctuate between a high above 0.50 and a low below 0.15; to Vietnam, where the measure never exceeded 0.30. Because Asia is a region where agricultural mechanization is still proceeding apace, and where regime type varies significantly both across states and through time, it is a suitable context in which to test our hypotheses on the relationship between mechanization and the preferences of rural elites for regime type.

There are relatively few studies of elite attitudes toward democracy in Asia. Mass support for democracy is high across the region, although it is seen by many as a less important goal than economic development and government performance.<sup>23</sup> Kai-Ping Huang and Paul Schuler find Asians with higher levels of generalized trust are less supportive of regime change and see trust as a potential obstacle to democratization.<sup>24</sup> Wen-Chin Wu and Yu-Tzung Chang find that individuals' subjective perceptions of unfair income inequality are associated with less satisfaction with democracy.<sup>25</sup> A study of

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<sup>22</sup> Samuels and Thomson, "Lord, Peasant... and Tractor?" and Michael Coppedge et al., "V-Dem Country-Year Dataset v8," Varieties of Democracy Project, <https://www.v-dem.net/en/data/archive/previous-data/data-version-8/> (accessed March 20, 2021). Unfortunately, results of the 2010 round of global agricultural censuses have not been released yet and there are no data available on agricultural mechanization for these countries after 2000.

<sup>23</sup> Yun-han Chu, Larry Diamond, Andrew J. Nathan, and Doh Chull Shin, *How East Asians View Democracy* (New York: Columbia University Press, 2008), and Alex Chang, Yun-han Chu, and Bridget Welsh, "Southeast Asia: Sources of Regime Support," *Journal of Democracy* 24, no. 2 (2013): 150-162.

<sup>24</sup> Kai-Ping Huang and Paul Schuler, "A Status Quo Theory of Generalized Trust: Why Trust May Reduce the Prospects for Democratic Transition in Asia," *Comparative Politics* 51, no. 1 (2018): 121-132.

<sup>25</sup> Wen-Chin Wu and Yu-Tzung Chang, "Income Inequality, Distributive Unfairness, and Support for Democracy: Evidence from East Asia and Latin America," *Democratization* 26, no. 8 (2019): 1475-1492.

Indonesian parliamentary elites finds they are significantly more supportive of democracy than the general public.<sup>26</sup> However, to the best of our knowledge there have been no previous cross-national empirical analyses of elites' attitudes toward democracy across Asia—especially addressing the standpoints of rural elites.

Unfortunately, the ABS does not include questions on land ownership that would allow us to precisely identify this stratum of rural elites. However, its coding of individuals' occupations makes it possible for us to distinguish between agricultural workers and self-employed farmers or farm managers.<sup>27</sup> Individuals included in the latter category are much more likely to own land, employ rural workers, and, therefore, be members of the rural elite for our theoretical purposes. This measure is not perfect: the coding of self-employed farmers also includes subsistence farmers and farm managers, who are not agricultural workers, but also not necessarily landed or rural elites. However, this is the best measurement of rural elites that the ABS allows. Self-reported social status is significantly higher for these self-employed farmers compared to others working in the agricultural sector.

Uniquely among cross-national surveys of mass political attitudes, the ABS also includes a question on tractor ownership. Unfortunately, it was asked in only a subset of countries: Japan, the Philippines, Thailand, Indonesia, Singapore, Vietnam, Cambodia, and Malaysia. This restricts our sample to these eight countries of the total of thirteen included in the third wave of the ABS. We operationalize “shifting away from reliance on human labor and towards mechanical production” as whether an individual owns a tractor.<sup>28</sup>

## Dependent and Independent Variables

Our argument implies that mechanized rural elites will be more supportive of democracy than their nonmechanized counterparts. The first dependent variable in our analyses measures support for democracy using responses to

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<sup>26</sup> Edward Aspinall, Diego Fossati, Burhanuddin Muhtadi, and Eve Warburton, “Elites, Masses and Democratic Decline in Indonesia,” *Democratization* 27, no. 4 (2020): 1475-1492.

<sup>27</sup> This coding is based on the International Standard Classification of Occupations (ISCO). Self-employed farmers or farm managers are either ISCO 1211, “Production department managers agriculture and fishing”; ISCO 1311, “General managers agriculture, forestry & fishing including Farm Manger, Self-employed Farmer with personnel”; ISCO 6131-6133, “Mixed farmers, Farm foremen/supervisor, Farmers”; or ISCO 6200-6210, “Subsistence agricultural & fishery workers.” Farm workers, on the other hand, are coded under ISCO 6100-6130, which includes several categories of agricultural and fishery producers; ISCO 6140, “Forestry etc. workers”; ISCO 6150, “Fishery workers, hunters and trappers”; ISCO 8331, “Motorized farm & forestry plant operators”; and ISCO 9120, “Agricultural, fishery etc. laborers.”

<sup>28</sup> The countries and China region excluded because the question on asset ownership is missing are South Korea, Mongolia, Taiwan, China, and Hong Kong. This survey item includes not only tractors but also other assets such as autos, motorcycles, and televisions.

the question, “Where would you want our country to be in the future?” that fall on a 1–10 scale from “completely undemocratic” to “completely democratic.” We chose this question because it requires respondents to indicate specifically what they want their country’s regime type to be. This matches most closely our theory’s focus on the costs and benefits of distinct regime types to individual rural elites. Other questions on democracy in the ABS ask respondents whether they believe their country is suited to democracy, about the abstract desirability or efficacy of democracy compared to other systems of government, or whether they support specific types of political regime change. These questions are not as clearly related to individuals’ personal self-interest and are potentially more prone to social desirability bias or varying interpretations of the concept of democracy. We therefore believe that our dependent variable best captures the link between individuals’ economic interests and regime-type preferences.<sup>29</sup> After excluding responses of “Do not understand,” “Can’t choose,” and nonresponses, the variable *Democracy* ranges from 1 to 10, has a mean of 8.3, and a standard deviation of 2.1. We present summary statistics of all variables included in our analyses in table 1.

Our second dependent variable measures variation in rural elites’ view of what democracy entails, from law and order to investment in public goods, education, and employment opportunities. It uses the question, “Which one would you choose as the most essential characteristics of a democracy?” where possible responses are: “1. Government ensures law and order; 2. Media

Table 1. Summary Statistics, Asia Barometer Wave 3 Data

Variable	Observations	Mean	Min.	Max.
Democracy	9,285	8.23	1.00	10.00
Public Goods	8,494	1.10	0.00	2.00
Farmer	9,285	0.05	0.00	1.00
Tractor	9,285	0.04	0.00	1.00
Farm Worker	9,285	0.13	0.00	1.00
Gen. Trust	9,081	1.59	0.00	3.00
Econ. Perf.	9,206	1.92	0.00	4.00
Status	8,609	5.55	1.00	10.00
Age	9,282	44.37	17.00	90.00
Female	9,282	0.50	0.00	1.00
Married	9,248	0.71	0.00	1.00
Religious	9,073	0.51	0.00	1.00

<sup>29</sup> These different measures of support for democracy are not strongly correlated, suggesting that they are measuring different underlying concepts.

is free to criticize the things government does; 3. Government ensures job opportunities for all; 4. Multiple parties compete fairly in the election.” This question is not perfectly suited to our analysis because it asks about individuals’ ideal conceptions of a democracy, not their policy preferences under any regime type. However, given that we posit that mechanized rural elites are relatively supportive of democracy, this question provides information about whether they hope that this regime type will actually lead to lower levels of labor repression—or lesser emphasis on law and order—and greater investment in public goods and employment opportunities—or the government’s ensuring job opportunities for all. We code the ordinal variable *Public Goods* as zero for response 1, emphasizing the government’s providing for law and order under democracy; as one for responses 2 and 4 that emphasize procedural aspects of democracy related to freedom of expression and competitive elections; and as two for response 3, emphasizing the government’s providing for job opportunities. The distribution of the *Public Goods* variable is relatively uniform across the three outcomes in our sample: 27.4 percent of respondents saw government provision of law and order as the most essential characteristic of democracy; 35.1 percent emphasized procedural aspects of freedom of expression and competitive elections; and 37.5 percent emphasized the government’s ensuring job opportunities for all. The *Public Goods* and *Democracy* variables are only very weakly, negatively correlated at  $r = -0.02$ .

The key independent variables in our analyses identify rural elites as described above. *Farmer* is coded one for individuals who are independent farmers or farm managers, and zero otherwise.<sup>30</sup> Only 497, or 5.3 percent, of individuals included in our analysis are coded as farmers. This should not be surprising, because in 2011 agriculture’s share of total employment in these countries ranged from 11.5 percent in Malaysia to 57 percent in Cambodia.<sup>31</sup> Given that only a small share of those employed in the agricultural sector are independent farmers, they make up a small share of survey respondents. In some of our analyses, we distinguish among individuals working in the agricultural sector using the variable *Farm Worker* that is coded one for individuals who are farm workers, and zero otherwise. We measure the uptake of labor-saving agricultural technologies with the binary variable *Tractor* that is coded one if an individual owns a tractor and zero otherwise. Only 383, or 4.1 percent, of individuals included in our analysis owned a tractor. These relatively small numbers raise the bar for finding statistically significant effects of the variable in our regression models.

Many of our models include a set of demographic controls for age, sex, marital status, and religiosity. Some also control for *Status*, an individual’s

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<sup>30</sup> Almost 30 percent of respondents in the survey did not indicate their occupation or listed it as “not applicable.” We exclude these individuals from our analyses. However, including them as the base category for our *Farmer* variable does not substantively change our results.

<sup>31</sup> The World Bank, “World Development Indicators” (2018), <https://datacatalog.worldbank.org/dataset/world-development-indicators> (accessed March 19, 2021).

subjective assessment of his or her family's social status, measured on a highest to lowest scale of 1–10. This question is more useful than a measure of income. Incomes do not vary much among individuals employed in the agricultural sector because they are so low compared to national averages. Self-reported social status displays more variation among these individuals and is more likely to capture distinctions that are not reflected in income levels. We also control for *Education*, measured in years. In addition, following Huang and Schuler, we control for individual-level general trust.<sup>32</sup> The variable *General Trust* captures responses to a question about whether most people can be trusted. Finally, following Alex Chang, Yun-han Chu, and Bridget Welsh, we control for perceptions of economic performance using the variable *Economic Perf*.<sup>33</sup>

## Analysis and Results

We first estimate a series of linear regression models of *Democracy*, all with country fixed effects and robust standard errors, with results displayed in table 2. We test Hypothesis 1 using an interaction between the *Farmer* and *Tractor* variables, comparing farmers' attitudes toward democracy to those of others, and comparing attitudes among those farmers who own tractors to those among farmers who do not. When reporting our results, we do not interpret the individual regression coefficients presented in table 2. Instead, we calculate and present marginal effects and measures of uncertainty that take into account the interactive nature of the model.<sup>34</sup>

Model 1 includes *Farmer*, *Tractor* and the two variables' interaction term, alongside a set of country fixed effects, for the full sample of countries in the ABS where surveys asked about tractor ownership. In this model, the first thing to note is that—as conventional wisdom might predict—independent farmers are somewhat less supportive of democracy on average than other respondents. However, this difference is small and not statistically significant. The average level of the *Democracy* variable among farmers is 8.21 versus 8.23 among others, but this difference is only 0.02 of one standard deviation on the variable and does not approach statistical significance ( $p < 0.76$ ). The second thing to note is that even though average support for democracy is fairly right-skewed to begin with, again raising the bar for finding statistically significant differences, *tractor-owning* farmers demonstrate greater support for democracy than non-tractor-owning farmers. Non-tractor-owning farmers' level of support is 8.19, compared to 8.57 for tractor owners, on average. This difference, which provides initial support for our core hypothesis, is relatively

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<sup>32</sup> Huang and Schuler, "A Status Quo Theory."

<sup>33</sup> Chang, Chu, and Welsh, "Southeast Asia."

<sup>34</sup> Thomas Brambor, William Roberts Clark, and Matt Golder, "Understanding Interaction Models: Improving Empirical Analyses," *Political Analysis* 14 (2006), 63–82. All predicted values and marginal effects are calculated using the *Margins* command in Stata.

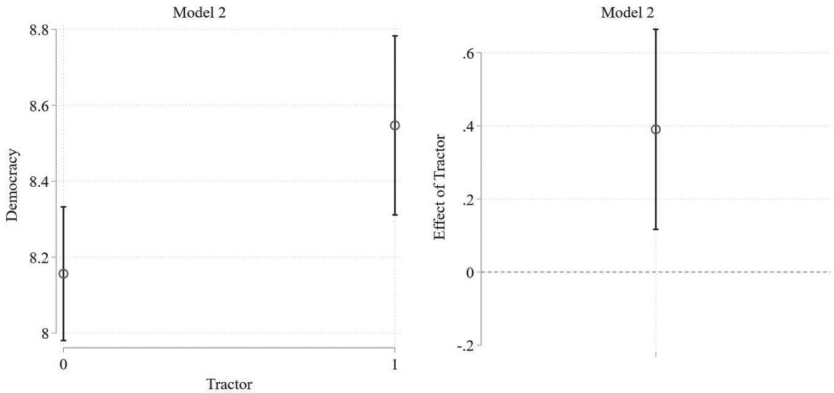
Table 2. Regression Models of Tractor Ownership and Support for Democracy, Conceptions of Democracy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Democ.	Democ.	Democ.	Democ.	Democ.	Democ.	Public Goods	Public Goods
Farmer	-0.04 (0.09)	-0.07 (0.09)	-0.04 (0.10)	0.00 (0.10)			0.11 (0.09)	0.08 (0.09)
Tractor	-0.02 (0.10)	-0.02 (0.10)	-0.04 (0.11)	-0.02 (0.17)	0.24* (0.14)	0.02 (0.11)	0.16 (0.12)	0.05 (0.12)
Farmer*Tractor	0.39** (0.17)	0.41** (0.17)	0.38** (0.18)	0.36 (0.23)			0.31 (0.31)	0.38 (0.31)
Farm Worker						-0.00 (0.07)		
F. Worker*Tract						-0.09 (0.24)		
Gen. Trust			0.05** (0.03)	-0.03 (0.03)		0.05** (0.03)		-0.05* (0.03)
Econ. Perf.			0.10*** (0.03)	0.07** (0.03)		0.10*** (0.03)		-0.07*** (0.02)
Status			0.07*** (0.01)	0.05*** (0.01)		0.07*** (0.01)		-0.05*** (0.01)
Observations	9,285	9,037	8,100	5,326	497	8,100	8,612	7,799

Note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

large—corresponding to an increase of 19 percent of one standard deviation from slightly below the mean on the *Democracy* variable. The joint significance of the *Farmer*, *Tractor* variables and their interaction term is  $p < 0.04$ , and the marginal effect of tractor ownership on support for democracy among farmers is significant at the  $p < 0.008$  level. From this model, which does not include any individual-level controls for confounding variables, we draw strong initial support for our hypothesis that tractor-owning farmers demonstrate higher levels of support for democracy than their non-tractor-owning counterparts.

Figure 2. Tractor Ownership and Farmers’ Support for Democracy, Model 2, Table 2



What happens when we include individual-level demographic controls for age, sex, marital status, and religiosity alongside the country fixed effects in model 1? Model 2 does this. We graph this model’s predicted levels of support for democracy among tractor-owning and non-tractor-owning farmers in the left-hand panel of figure 2, and the marginal effect of *Tractors* among farmers in the right-hand panel. Here, independent farmers remain slightly less supportive of democracy than the population average. The average level of support for democracy among farmers is 8.17, compared to 8.23 among others, but this effect is not statistically significant ( $p < 0.54$ ).

However, in model 2, the difference in support for democracy between tractor-owning and non-tractor-owning farmers becomes slightly greater in magnitude and statistical significance than in model 1. Tractor-owning farmers’ average level of *Democracy* is 8.55, versus 8.16 for their non-tractor-owning counterparts. This difference—0.39 versus 0.38 in model 1—is significant at the  $p < 0.005$  level and the joint significance of *Farmer*, *Tractor* and their interaction term is  $p < 0.04$ . From model 2, we conclude that after controlling for demographics, tractor ownership remains robustly associated with greater support for democracy among independent farmers.



In model 3, we subject this result to further scrutiny by controlling for socio-economic status, education, general trust, and perceived economic performance, all of which are significant predictors of support for democracy. The inclusion of these controls only slightly decreases the size and significance of the *Tractors* effect on support for democracy among independent farmers. The variable is associated with an increase in support for democracy from 8.16 to 8.50, and this effect is significant at the  $p < 0.02$  level.

At this point, it is worth considering the substantive size of the effect of the *Tractor* variable on attitudes toward democracy. In model 3, social status and perceptions of economic performance are the most significant predictors of attitudes toward *Democracy* ( $p < 0.01$ ). As respondents' self-reported social status increases by two standard deviations, from 3.5 to 7.5 on a 10-point scale on the *Status* variable, the value of *Democracy* increases by 13 percent of a standard deviation, from 8.05 to 8.33—a change 18 percent smaller in magnitude than that associated with the *Tractor* variable among farmers in the same model. Similarly, a two-standard deviation increase in perceptions of government economic performance as measured by the *Econ. Perf.* variable corresponds to an increase in the *Democracy* variable from 8.09 to 8.30. This is an increase around one-third of the magnitude of that associated with the *Tractor* variable among farmers. The substantive effect of the *Tractor* variable on support for democracy among farmers is large, even compared to the most important socio-economic predictors of attitudes toward democracy in the ABS.

In model 4, we exclude respondents from Japan, Singapore, and Vietnam from our sample in order to better match our analysis to Moore's original argument about traditional landed elites. In all of these countries, independent farmers as captured by the *Farmer* variable are unlikely to represent such rural elites. In Japan, extensive land reform after World War II effectively eliminated the landlord class.<sup>35</sup> In Vietnam, the communist government carried out extensive land reform, eliminating traditional rural elites in the North in the 1950s.<sup>36</sup> Singapore, which is highly urbanized, lacks a large agricultural sector.

Results of model 4 are substantively similar to those of model 3. Average levels of support for democracy are 9.0 among tractor-owning farmers versus 8.65 among their non-tractor-owning counterparts. This effect—18 percent of one standard deviation on the *Democracy* variable—is somewhat smaller than the equivalent effect in model 3, which was run on the full sample. However, it remains statistically significant. The joint significance of *Farmer*, *Tractor* and their interaction term is  $p < 0.05$  and the marginal effect of *Tractor* among farmers is significant at the  $p < 0.02$  level. When excluding respondents from

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<sup>35</sup> Joe Studwell, *How Asia Works: Success and Failure in the World's Most Dynamic Region* (London: Profile Books, 2013).

<sup>36</sup> Edwin E. Moise, *Land Reform in China and North Vietnam: Consolidating the Revolution at the Village Level* (Chapel Hill: University of North Carolina Press, 1983).

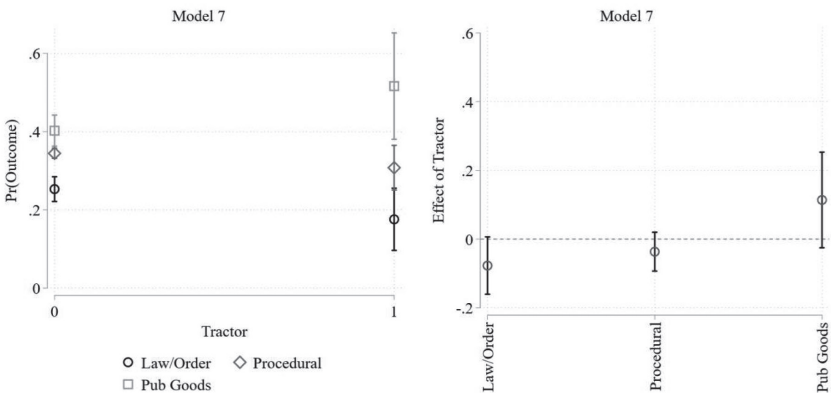
settings where independent farmers are least likely to represent traditional landed elites, we continue to observe a sizable and robust relationship between tractor ownership and support for democracy among rural elites.

In model 5, we restrict the sample to include only farmers, alongside country fixed effects, without further individual-level control variables. *Tractors* is associated with an increase in *Democracy* from 8.88 to 9.12, 13 percent of a standard deviation, but this effect is significant only at the  $p < 0.09$  level.

To address concerns that the differences in attitudes toward democracy associated with tractor ownership that we document above might hold for elite and nonelite individuals in the agricultural sector alike, we specify model 6 identically to model 3 but interact *Tractors* with *Farm Worker* instead of the indicator for independent or management-level *Farmers*. We expect that tractor ownership will not be associated with greater support for democracy among farm workers, because these individuals do not own or manage agricultural enterprises that depend on labor inputs. They have no interest in authoritarian governance that represses rural labor and reduces wages, regardless of whether they have access to labor-saving agricultural technology. In line with our expectations, the coefficient on the interaction term of *Tractors* and *Farm Worker* in model 6 is small, negative, and statistically insignificant. Tractor ownership is associated with only a very small decrease in support for democracy among farm workers, from 8.19 to 8.13, and this change does not approach statistical significance ( $p < 0.74$ ). This result supports our argument, as it narrows the effect of mechanization to those respondents in the ABS who most resemble “landed elites.”

We now estimate the effects of tractor ownership on farmers’ views of the essential characteristics of democracy using two ordered logistic regressions,

Figure 3. Tractor Ownership and Farmers’ Conceptions of Democratic Governance, Model 7, Table 2



both taking *Public Goods* as dependent variable, reported as models 7 and 8 in table 2. Model 7 is specified identically to model 2, including the *Farmer* and *Tractor* variables alongside their interaction term and controlling for age, sex, marital status, and religiosity alongside country fixed effects. We graph the results of this model in figure 3.

As shown in the left-hand panel, non-tractor owning farmers are most likely to view investment in public goods to ensure job opportunities for all as the most important characteristic of democracy; the probability of this response is 40 percent in model 7. Slightly less prevalent is the view that procedural aspects of democracy are its most important characteristic ( $p = 0.34$ ), while law and order is significantly less likely to be viewed as the most important aspect of democracy ( $p = 0.25$ ).

Among tractor-owning farmers, the above differences become much more pronounced. Public goods are far more likely to be emphasized as democracy's most important characteristic ( $p = 0.52$ ), there is a slight decline in the relative emphasis on freedom of expression and electoral competition ( $p = 0.31$ ), while law and order is much less likely to be cited as democracy's most important characteristic ( $p = 0.18$ ). As we graph in the right-hand panel of figure 3, the marginal effect of tractor ownership on support for the proposition that democracy's most important characteristic is government promotion of law and order is significant at the  $p < 0.07$  level, while its effect on support for the role of public goods provision is significant at the  $p < 0.11$  level. The results of model 8, which includes a more complete set of individual-level control variables, are substantively similar to those of model 7. Predicted levels of support for each *Public Goods* outcome are very comparable, while the statistical significance of the marginal effects of the *Tractor* variable is slightly weaker.

Overall, even given the limitations imposed on our analysis by limited data availability and questions not specifically designed to test our theoretical claims, there is strong empirical support for our hypothesis, which associates tractor ownership in the rural sector with both stronger preferences for and a distinct vision of democracy's purpose.

## Discussion and Conclusion

This essay explores the effect of agricultural mechanization on landed elites' preferences for democracy and conceptions of democracy. Although at first glance this may seem unlikely, we found that tractor-owning independent farmers are, on average, more supportive of democracy than their non-tractor-owning peers, and that the changes in regime-type preferences associated with tractor ownership are substantively large and statistically significant. The reason for this unexpected finding follows from the impact of mechanization on farmers' perception of the relative costs and benefits of different political regimes. For farmers, the potential "costs" of democracy, compared to the

benefits of autocracy in terms of political repression of rural labor, decline with the advance of agricultural mechanization. Farmers who retain some need to employ human labor, by contrast, remain more skeptical of democracy's benefits. We found as well that, given their relatively high levels of support for democracy, tractor-owning farmers are also significantly more likely to view this form of government as implying investment in public goods that ensure employment opportunities for all, rather than as ensuring law and order.

Given the centrality of landed elites to canonical theories of authoritarianism and democratization, it is remarkable that ours is—to our knowledge—the first attempt to explore the opinions of individual landed elites toward democracy and autocracy. Still more remarkable is our result, following the predictions of Samuels and Thomson, that agricultural mechanization has significant effects on these outcomes at the individual level.<sup>37</sup> We are surprised and heartened at these results, and hope that readers are also intrigued that an overlooked change in the structure of agricultural production can have significant effects on the chances for democratization at multiple levels of analysis.

The above analysis of freely available, observational data provides a useful starting point and test of the plausibility of the broader argument that agricultural mechanization has broad and heretofore poorly understood political effects, at both the micro- and the macro-level. However, the small numbers of independent farmers and tractor owners mean these nationally representative samples are imperfect for our purposes. Future research could place surveys and survey experiments online, which would allow for more precise targeting of rural residents; field more detailed questions about land ownership, agricultural production, and use of agricultural machinery; and delve into more precise examination of the causal mechanisms linking mechanization, demand for labor repression, and support for democracy.

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<sup>37</sup> Samuels and Thomson, “Lord, Peasant... and Tractor?”