Despite considerable normative support, analysts have failed to identify any systematic effects of democracy on domestic policy outputs. Building on a theory of the state as a monopoly producer of public services and establishing a common foundation for studying variations in regimes and their policy consequences, the authors hypothesize that democratic states will earn fewer monopoly rents and produce a higher level of services than autocracies. They test this hypothesis both cross-sectionally and over time for a variety of public health and education indicators. The statistical results strongly support their hypotheses. The authors conclude that democracy has real, substantively important effects on the daily lives and well-being of individuals around the globe.

# THE INVISIBLE HAND OF DEMOCRACY
## Political Control and the Provision of Public Services

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> Democracy is the worst form of Government except all those other forms that have been tried from time to time.
>
> —Winston Churchill, November 11, 1947

Under military rule in 1970, only 12% of rural residents in Argentina had access to what the World Bank calls safe water. Two years after the return to civilian rule in 1973, this figure rose to 26%. After the coup in 1976, access to

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safe water in rural areas fell again, to 17% (in 1984). During the transition to democracy in Greece, infant mortality fell from 34 deaths per 1,000 live births in 1972 to 25 deaths per 1,000 in 1977. The imposition of military rule in Nigeria in 1983 had a devastating effect on public services. Within 1 year, the proportion of each cohort persisting in school to fourth grade declined from 81% to 72%. Between 1982 and 1985, Nigerians younger than age 1 immunized against diphtheria, pertussis, and tetanus (DPT) fell from 20% to 9%. These are, admittedly, particularly clear and dramatic examples of the effect of democracy on the provision of public services. Yet when we multiplied and studied these observations in repeated cross-sectional examinations of 17 public services and in time-series cross-sectional (TSCS) analyses of five such services, we reached the same powerful conclusion: Democracy has a positive and profound effect on the daily lives and well-being of individuals around the globe.

At one level, this result is hardly surprising. It is consistent with normative expectations—and especially the sort of "end of history" triumphalism that has run rampant since the end of the Cold War. It is also in accord with our positive expectations that "of course" democracies are more responsive to citizen demands.

At another level, however, our findings cut against two common views. First, despite its recent spread, in many countries, among many people, and at the root of many theories of politics, there remains a profound skepticism about democracy's ability to meet the needs of individuals in a timely and effective fashion. This skepticism is reflected in ambivalent political reforms in the states of the former Soviet Union, in the Asian values campaign, and in numerous other ways. It is also manifest in scholarly works. Two public choice theorists, for instance, have suggested that—given its well-known inefficiencies—democracy must be a consumer good, something desired in and of itself. Rich consumers, they maintain, can afford not only to drive luxury cars but also to "participate in government for its own sake, even if this participation results in no other benefit to them" (Auster & Silver, 1979, p. 89). The responsiveness and effectiveness of democracy is by no means universally accepted.

Second, empirically oriented scholars have yet to identify any systematic policy or material consequences of democracy. In a now extensive literature, some studies find a positive effect of democracy on growth, some find a negative effect, and some find no effect. No consistent pattern emerges from the empirical record (see Przeworski & Limongi, 1993; Sirowy & Inkeles, 1991). The striking exception is, of course, the so-called democratic peace, the seemingly robust (if still contested) finding that democracies almost never fight one another. But this result pertains only to foreign policy and,

more important, to dyadic relations between democracies (Doyle, 1986; Russett & Oneal, 2001). To date, scholars have found scant evidence—and none on the domestic policy side—that democracy matters for the material conditions of everyday life.[1]

Our findings clearly indicate that democracy has real, substantively important benefits for society. We do not argue that democracy necessarily produces the socially optimal level of public services. Democratically elected politicians are not the omniscient and omnipotent social planners who reside in the textbooks of welfare economists. Rather, through our empirical investigations, we confirm only Churchill's aphorism. Nonetheless this is a significant and heartening finding.

If our findings on democracy are consistent with widely held normative and positive expectations, our view of autocracy and its implications for a more general theory of politics is perhaps more challenging to received wisdoms. In the study of democracies, it is commonplace to assume that politicians want to maximize their chances of election and thus derive their policy preferences from those of their constituents. But this "electoral connection" (Mayhew, 1974) is at best a reduced form model of politics in which the constraints of existing political institutions are incorporated into the preferences of politicians. In the study of autocracies, the electoral constraints are much looser, and in turn, no simplifying assumption about political motives has been readily available. Analysts often posit a broad range of goals for autocrats, including power, wealth, or ideology (see Wintrobe, 1998). Conversely, even while concluding that some measure of insulation from civil society is necessary for welfare-improving economic transformations, developmental states are (often) implicitly assumed to be benevolent social welfare maximizers (Haggard, 1990; Huntington, 1968). Yet broad goals are unhelpful in constructing falsifiable theories, and benevolence among autocrats seems empirically rare.

The following analysis applies to all politicians the assumption of utility maximization that is standard in economics and typically made about other political-economic actors. We show how this translates into a proximate goal of maximizing rents earned from the monopoly power of the state. This is a universal motivation of politicians. We then interpret political regimes as imposing varying constraints on how politicians pursue and, with varying success, reach this goal. Viewed in this way, autocrats are unusual only in their ability to earn greater rents. Our empirical evidence suggests that this may not be an unreasonable assumption on which to build a more compre-

1. A suggestive line of inquiry looks at regime type and economic stabilization policies. See Kaufman and Stallings (1989).

hensive theory of politics, especially one applicable to nondemocratic polities.

## AN ECONOMIC THEORY OF THE STATE

Building from a class of public choice models, we conceive of states as firms that produce public services in exchange for revenue. Their monopoly of the legitimate use of force, a defining characteristic, gives states a comparative advantage in producing goods where collective action problems, informational asymmetries, contractual impediments, and other barriers to voluntary exchange would otherwise create market failures. States may expand beyond their areas of comparative advantage, but producing services that mitigate market failures is the core of their business.[2]

Due to their unique ability to employ violence legitimately, states possess a natural monopoly within their core areas of production. Nonetheless states produce within a contestable market.[3] That is, although only one state exists within a given territory, it (or its management, the senior politicians) can be displaced more or less easily, depending on the barriers to exit for potential competitors and the costs of political participation to citizens.[4] When barriers to exit and costs of participation are low, as in a democracy, the state will produce as a regulated monopoly, provide relatively larger quantities of goods at relatively lower prices, and thereby earn fewer supernormal profits or monopoly rents.[5] When barriers to exit and costs of political participation are high, as in an autocracy, the state will exercise its monopoly power, provide fewer public services, and earn greater rents.[6]

2. A further prediction of our theory, which we do not test here, is that autocratic states will also expand the areas of economic activity in which they exercise their monopoly power. Democratic states will be more constrained to produce in their areas of comparative advantage.

3. On contestable economic markets, see Baumol, Panzar, and Willig (1982).

4. We do not examine international competitors—other states—that may also render any particular market more contestable. See North (1981).

5. On rents and rent seeking, see Buchanan, Tollison, and Tullock (1980).

6. There is a significant class of public choice and public finance models that focus on the nature of public goods and the preferences of citizens to explain patterns of public services and the size of government. For a review, see Mueller (1989, chap. 17). Even when the monopoly power of the state is recognized in this literature, state rents are understood, at least implicitly, to be constrained by the ability of voters to remove politicians from office without cost. Institutional rules may allow bureaucrats to manipulate the production of public services to their advantage, but such manipulations still occur within a thoroughly democratic context. See Romer and Rosenthal (1979). This literature focuses on many important factors, but in our view, the attributes studied pale by comparison to the gross differences in the politics of democracies and autocracies.

**ASSUMPTIONS**

We assume that politicians, like all individuals, are utility maximizers. Like any individual, a politician's utility is composed of both a divisible component based on his or her monetary income (salary and cash bribes) and used to consume a variety of goods (e.g., houses, cars, food) and an indivisible component based on nonmonetary benefits that derive from the job. The latter benefits include all those intangibles that lead individuals to choose one career over others; in politics, these may include perquisites of office, prestige, public respect and adulation, privileged access to scarce commodities, and the elusive goal of influence. Again, like any individual, politicians seek to maximize the sum of their divisible and indivisible utility. Any return greater than that obtainable in their next best occupation is the rent earned by the politician.[7]

On the basis of this first assumption, we further assume that the state seeks to maximize its normal profits, covering its costs of production, and rents.[8] Like modern economic firms, states are long-lived corporate entities composed of many individuals, each of whom is seeking to maximize his or her utility. Firms harness the desires of individuals through an internal hierarchy in which owners and/or managers command and oversee many lower-level supervisors and, in turn, workers.[9] Although certainly not perfect in that the corporate entity is not as unified as a sole-proprietor firm and there are real costs to internal control, hierarchy is relatively efficient in solving internal collective action and contractual problems and in allowing a large number of disparate individuals to work together to maximize their joint returns. This mechanism creates the largest possible pool of net resources, including both normal profits and rents, that can then be distributed to members to satisfy their divisible and indivisible desires. It is the internal hierarchy of the corporation that allows analysts to extend the assumption of profit maximization from the sole proprietor to the multidivisional conglomerate.[10] States are organized in similar ways to similar effects, with politicians or rulers com-

7. That politicians seek rents does not mean that they necessarily enjoy returns greater than those available in their next best occupations. Just as firms in perfectly competitive markets seek to maximize profits but in equilibrium earn none, politicians may seek rents but receive only their "reservation" utilities. That few politicians in established democracies such as the United States appear to earn significant rents—especially of the pecuniary and easily monitored kind—does not count against this assumption; this is exactly what our theory would predict.

8. For similar generalizations from individuals to the state, see Brennan and Buchanan (1980), North (1981), and Levi (1988).

9. There may also be an external hierarchy through which shareholders control managers.

10. On corporate governance structures, see Williamson (1985). On internal hierarchies, see Miller (1992).

manding and overseeing bureaucrats.[11] As with firms, the internal hierarchy of the state allows the collective to maximize the public equivalent of profits and rents, the difference between revenues and costs of production, and then distribute the net resources to members. As with firms, those individual members most important for the output of the state or central to managing the internal hierarchy will earn disproportionate returns, but all will earn at least their reservation wages. And as with firms, the state is constrained by the costs of monitoring and controlling members of the internal hierarchy who may still have desires to shirk. Nonetheless the net effect is that the state as a corporate entity is relatively efficient at satisfying the desires of its members for divisible and indivisible utility.[12] It is on this basis that we assume that states can be understood, at least to a first approximation, as rent-seeking actors.

The state's ability to earn rents, in turn, is a function of the public services produced for citizens.[13] The state, like a firm, is constrained by the law of supply and demand, with the proviso that the state, as a monopolist, can deter-

11. Not all states are internal hierarchies to the same degree. Although we do not take up this issue, the degree of internal hierarchy is partly endogenous to our theory. When the political market is relatively contestable, citizens will structure the internal organization of the state so as to induce competition and further restrain rents. Thus, democratic states should be more internally competitive. Although limited to democracies, some general evidence to this effect is provided in Breton (1998). Conversely, weak (less hierarchic) autocratic regimes may possess multiple agencies that can individually block public services and extract rents. In this case, the aggregate rate of extraction will be inefficiently high (i.e., the sum of rents is too small) and the quantity of public services inefficiently small. See Shleifer and Vishny (1993).

12. States may be more likely than firms to contain more complicated chains of delegation, as in the United States where bureaucratic agents possess both Congressional and executive principals. But such complicated principal-agent relationships are not unique to politics, as any employee caught between the conflicting demands of finance, marketing, and production managers can attest. Equally important, such complicated lines of authority are likely to be the product of self-conscious decisions to decentralize power to (a) constrain the state itself, as in democracies, or (b) limit challengers to the ruler.

13. Economic theories of the state come in two varieties, one focused on public goods and extraction and the second on quasi-public goods and exchange. Strictly speaking, it is impossible to derive a demand function for pure public goods (once provided for one, the good is provided for all at no additional cost). As a result, there is no market for public goods. As a consequence, the first approach posits that states extract a fixed share of the economy and invest in public goods, such as property rights or infrastructure, only because they stimulate growth and thus enlarge the pie. In this view, an autocratic ruler with a sufficiently long time horizon (to recoup his investments) will adopt policies that are almost as efficient as those adopted by democracies. For a clear example, see Olson (2000). Few pure public goods exist, however, as reflected in our use of the term *public services* to denote government output. Most public services are quasi-public goods or private goods with large externalities (such as education). This allows us to speak meaningfully of a demand for public services that varies by price. The second version of the economic theory of the state, employed here, does posit a market for public services in which states

mine the price of its services by its output decisions.[14] If the state produces services that are not in demand (excess supply), citizens will shirk on their taxes or demand fiscal reforms, fail to offer bribes and other rewards to politicians, castigate rather than venerate their leaders, and otherwise deny rents to politicians. If states use coercion to force citizens to acquiesce in undesired policies, the costs of producing those services will necessarily increase and reduce the available rents. Conversely and far more likely if our theory is correct, if the state restricts the supply of services (excess demand), citizens will support higher taxes, bid up the nominal tax price by offering bribes and favors to those politicians able to secure the scarce services, express greater respect or adulation for the leader, and otherwise curry favor with those who have access to the scarce commodities. In an extreme but entirely predictable example, the institutionalized corruption of the Soviet system followed naturally from the artificial scarcity of the command economy (Shleifer & Vishny, 1992).

## POLITICALLY CONTESTABLE MARKETS

Political institutions define the structure of the political market. Although the state is a natural monopoly, it is not this fact that matters for patterns of public service provision but the extent to which the political market is contestable. In perfectly contestable markets in which the current monopolist is restrained by the possibility of new entrants, even natural monopolies will not possess market power. Monopoly power and, in turn, rents increase as the market becomes less contestable. At the most general level of comparison, the contestability of political regimes depends on two variables: the availability of alternative rulers, which is a function of the incentives for individuals to enter the political arena and bid for supporters, and the costs of political participation, especially the costs to citizens of deposing one leader and installing another.[15]

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"sell" their output to citizens and receive taxes (and other returns) as "payment." In this approach, even autocrats with small discount factors will exploit their monopoly power and restrict the quantity of public services provided (discussed as follows). Both versions of the theory predict that democracies should perform better. Nonetheless, if some autocracies perform almost as well as democracies, as expected by the first approach, it would be harder for us to find any significant differences between the two categories of regimes; the strong effects of democracy relative to all autocracies as follows tends to support our approach.

14. On citizen preferences and the estimation of price and income elasticities, see Borcherding and Deacon (1972) and Bergstrom and Goodman (1973).

15. Many specific features of political institutions will influence the production of public services, including the agenda-setting power of leaders, the number of veto players, the reversion point, and so forth. In this study, we seek to capture gross differences between different regime

The incentives for politicians to enter the political market depend crucially on their subsequent barriers to exit.[16] In politics, alternative rulers face large fixed costs if they choose to compete for office. They must develop distinct platforms that attract adherents, cultivate reputations for competence, build networks of cadres to oversee and motivate supporters, and construct organizations—parties—to coordinate the positions and actions of their followers. These tasks often require years of careful political investment. Crucially, once incurred, these initial costs are difficult to recover. The secondary market in which the platforms and reputations of individual politicians can be exchanged is virtually nonexistent. Rulers may be able to anoint a successor with the hope of retaining some power, but there will be substantial slippage in the transfer. Retired politicians may be able to "cash in" through consulting or remunerative jobs in the private sector, but the value of their political connections depends not only on prior experience but also on the new government in power. Political parties mitigate the incentive problems that arise from nonrecoverable costs. As long-lived entities that partly internalize entry costs, political parties permit individuals to compete for office without incurring the full costs in each election. Yet even where parties and their leadership evolve over time, they typically cannot dispose of their assets in any profitable way. There are always some barriers to exit in politics and thus limits on the degree to which political markets are contestable.

Nonetheless barriers to exit vary systematically with regime type. In democracies, the costs of defeat in any single election are low. Defeated competitors often survive as minority or opposition parties, and they are free to compete again in the next election. At worst, defeated competitors retire from politics and pursue other occupations (often with higher divisible utility). In autocracies, on the other hand, the costs of defeat are substantially higher. Failed contenders are excluded from power and often exiled or murdered. In nearly all cases, their initial investments are vitiated by the coercive power of the state. Although the political market is never perfectly contestable, democ-

types. Neither our analytic concepts nor our empirical variables are likely to pick up small differences in how institutions perform—especially among democracies, where the field's understanding of institutional variation is most developed.

16. In the absence of any change in political institutions or market structure, successful candidates are bound by the same incentives as displaced rulers. Any package of services and taxes offered by a competitor in a bid for support can be offered by the existing ruler. As a result, the incentives of alternative rulers to enter the political market are determined not by the magnitude of the rents they may earn, which are endogenous, but by the costs of exit that they face. We traditionally think of barriers to entry as important, but such hurdles need not deter competitors from arising if the costs incurred can be recouped on exit, either by diverting accumulated assets to other uses or selling them to others (Baumol et al., 1982).

racies have much lower barriers to exit and therefore more competitive political systems.

Not only must alternative rulers have incentives to enter the political market, but citizens must also offer support and assist candidates in obtaining power. Participation is the transaction cost of politics borne by citizens. The greater their costs of political participation, the more citizens will be locked into supporting or at least acquiescing to the current ruler and, on average, the less contestable the political market will be.[17]

Political participation can take many forms, and the costs of engaging in each are distributed unevenly over society. Getting to the polling station is more difficult for some, wealthy citizens can more easily afford to make generous contributions, and the military can more readily use force.

It is the costs to the median or, if more than a simple majority is required to change rulers, the "pivotal" citizen of effectively removing the current leader from power that in turn determines whether the state can exercise its monopoly power.[18] Every society has some low-cost participators, and because they can remove politicians more easily, leaders are especially responsive to their demands. If the costs are highly skewed and the average is high, then only a small number of citizens enjoy low relative costs of participation. This small group can gain by bargaining for a share of the rents earned by the state, whether directly through transfers or indirectly through lower taxes (thereby lowering the effective price of the public services they receive). As a result, their interests coincide with those of the politicians. Indeed, this small group will be a primary lobby for expanding the monopoly power of the state, as witnessed by the cronyism of the Philippines under Marcos and Indonesia under Suharto. In this case, the pivotal citizen finds it costly to remove politicians from office, and thus her or his ability to punish those who earn rents in office is low. If the group of low-cost participators is large and contains the pivotal citizen—that is, the distribution is flat and the average is low—then the pivotal citizen is likely to form an encompassing coalition and can gain

17. In this context, many readers will think of Hirschman (1970). Although Hirschman treated exit as a characteristic of economic markets and voice as a political phenomenon, the two are complementary: Without the possibility of exit, voice carries little weight.

18. This discussion parallels that of Bueno de Mesquita, Morrow, Siverson, and Smith (1998), who focus on variations in the size of the selectorate and minimum-winning coalition. We emphasize the costs of political participation to citizens and thus have a more continuous concept of political participation. Rather than distinguishing between those who can participate in politics (the selectorate) and those who cannot, we see even disenfranchised citizens as having other (but more costly) forms of political power. Nonetheless their model, unknown to us when we began, is consistent with our first hypothesis and the supporting empirical evidence presented as follows. It is not clear to us whether their model predicts the same policy consequences of regime change (our additional hypotheses and supporting evidence).

only by reducing state rents (Olson, 1965). In short, we focus here not on competition for office and the preferences of the pivotal citizen but rather on the costs of political participation to that individual who, in turn, sets the outer bounds of state exploitation. Within this limit, any politician has an incentive to earn rents (and perhaps redistribute some fraction to lower cost participators). Beyond that limit, however, citizens will remove the politician and, following the logic of an Olsonian encompassing coalition, act to reduce the monopoly power of the state.

In democracies, the primary form of political participation is voting. The costs of undertaking actions that can contribute decisively to a change of leadership are quite low and broadly shared. As a result, politicians are tightly constrained and the state can earn relatively fewer rents. In autocracies, on the other hand, elections are typically ineffective. To support a challenger for office is often risky, with vocal proponents courting jail or other punishment. Working actively to replace the existing ruler is even more fraught with peril; mass demonstrations or armed rebellion carry significant risks. Although there is power in numbers and risks to latecomers are far lower than for the first extremists to denounce the regime, the costs of political participation to the pivotal citizen in autocracies are still substantially higher than in democracies—and so are the rents politicians can extract.

## IMPLICATIONS

The less contestable the political market, the greater is the monopoly power of the state. Given our assumptions above, it follows that states will exploit their monopoly power whenever and to the extent possible so as to maximize the utility of or net benefit to politicians. Unfortunately this core prediction of our theory is difficult to test. Monopoly rents cannot be measured directly, especially as many forms of political utility are obscured from public view (e.g., graft) or take nonpriced forms (e.g., public respect).[19] Even when rents are monetized, we cannot accurately assess the true costs of producing public services. Each state is a monopolist in its own territory. States typically produce a range of services in exchange for a general tax, and thus we cannot determine the price paid for any particular service. In addition, tastes, qualities, and costs of production are likely to vary cross nationally.[20]

19. The more readily citizens can monitor and punish politicians, the more likely politicians will choose to divert their returns from easily assessed pecuniary income into hidden or nonpriced forms of utility.

20. As a result, we cannot control for price effects in the empirical models below. We recognize this as a significant limitation in our estimates. However, we expect this to cut against our hypotheses noted immediately as follows. If low-cost participators share in the benefits of the

Finally government budgets may obscure rents either by inflating expenditures—higher salaries, government-provided automobiles, and so forth for senior bureaucrats that make it appear that the state is putting more resources into, for example, public health than is really the case—or by shifting rents from one policy area to another. If states are earning rents, formal, declared expenditures may bear no relationship to outputs of public services. As but one example, in 1985, Jamaica, a country receiving the maximum democracy score of 10 on the Polity III scale (see below), spent 4% of its gross domestic product (GDP) on health care. In the same year, highly autocratic Jordan (which received a near-minimum democracy score of –9) spent 5% of its GDP on health care. Yet in Jamaica, 89% of new births were attended by health care personnel, whereas the corresponding figure for Jordan, a country with more than twice the gross national product (GNP) and roughly the same population as Jamaica, was 75%.[21] In this case, as in others, similar levels of apparent spending produce very different results. For all these reasons, public revenues and expenditures are misleading indicators of the magnitude of state rents. By nature and design, rents earned in the political market are opaque.

There are, fortunately, two readily observable implications of our theory. These are not indirect tests that could be shown to be false without damaging the standing of the theory. Rather, they follow by necessity from the logic outlined earlier in this article. First, like all monopolists, when states exploit their monopoly power, they must restrict the quantity produced to artificially inflate price. The state maximizes its returns (and rents) by producing where its marginal cost equals its marginal returns.[22] Assuming that permanent deficits are impossible, social welfare is maximized by producing where average returns (demand) equal average cost—the same point where a benevolent social planner would set quantity and price for a perfectly regulated private monopoly. Because marginal returns must be less than average returns, the state's preferred quantity is less than the social optimum. It follows that states that earn rents produce less of any public service than those that do not.

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state's monopoly power through lower taxes, their lower effective price will increase the quantity of the public services they demand and receive. To the extent that we find significant differences in the quantity of public services provided by democratic and autocratic states, we would expect that these differences would be even larger if we could control for price adequately.

21. Alternatively one might compare expenditures per capita (which are unavailable). If available, per capita expenditures would worsen the disparity. As noted, Jordan's GNP in 1985 was 2.3 times Jamaica's and its population nearly identical (2.6 versus 2.3 million, respectively). With Jordan spending a 20% larger proportion of its much larger gross domestic product on health care, its per capita expenditures would be substantially larger.

22. Given the nonpriced nature of at least some portion of political utility, returns not revenue (as common in models of private monopoly) is the appropriate metric here.

This implies that democracies, in which the political market is more contestable, should produce larger quantities of public services. Although not perfect, democracy should constrain the state to produce closer to the social optimum. Conversely autocracies should produce lower levels of public services. With greater monopoly power, autocratic states should restrict production to boost the returns of politicians. Most simply then, our central hypothesis is that democracies will provide higher levels of public services to their citizens than autocracies.

Second, we predict regimes that have undergone a significant political change will quickly produce a new and politically appropriate package of public services. This hypothesis is somewhat counterintuitive but follows from the logic of production within a contestable political market. In stable regimes, public services are likely to be in or near equilibrium: Even if the level of democracy rises or falls by a small increment, the level of public services produced by the state will not change significantly. In regimes that have recently moved in a nondemocratic direction, however, the new autocrats will immediately seek to drive down the level of public services so as to raise prices and in turn their rents. New autocrats gain not by continuing to provide the old level of public services but by dramatically cutting back on production. Where intuitively we might expect an "afterglow" in which previously higher levels of public services persist and deteriorate slowly after moves toward greater autocracy, our theory predicts exactly the opposite: active efforts by the new autocrats to suppress public services. Conversely in regimes that have recently become more democratic, elected leaders, faced with prospects of being voted out of office for failing to improve the welfare of their constituents, will place a high priority on quickly delivering a substantial improvement in public services. Thus, where again intuition might suggest that previously poor public services are hard to reverse—a negative afterglow—our political logic suggests that politicians in new democracies have strong incentives to deliver substantial and immediate policy change. This implies two additional hypotheses on political transitions: (a) fundamental regime changes will produce disproportionately large changes in levels of public services, and (b) the lags between changes in regime and public services will be relatively short.

Our analysis of democracy does not differ in spirit from those of many others who expect elected leaders to be more responsive to popular demands, to do better, and to provide public services closer to the social optimum. We place the motivations of democratic politicians into a broader comparative perspective, showing that maximizing chances for election is a product of a particular institutional setting, not a universal motivation. And we push democratic theory further to specify what responsiveness means in terms of pol-

icy outputs, at least in a relative fashion. Nonetheless we do not disagree with the spirit of other analyses.

At the same time, we know of no theory of autocracy that makes the same predictions as our model. Autocrats are often expected to exploit their citizens, but what this exploitation specifically entails is typically not made clear. The goals of autocrats are normally assumed to follow from the idiosyncratic preferences of individual rulers. Alternatively, to the extent that autonomy is necessary for economic transformation, it would seem to follow that developmental states would be expected to overprovide at least some public services. Conversely we predict a systematic bias in autocracies against the provision of public services.

## EMPIRICAL RESULTS

### DEPENDENT VARIABLES

We investigate numerous indicators of the level of education and public health provided by the state. Although neither is a pure public good, both education and public health possess substantial externalities and, as a result, lie within the state's comparative advantage. Although the form of state involvement differs from direct production in some countries to regulation of private service providers in others, both are core areas of state responsibility in nearly every country.

To ensure the robustness of our findings, we use multiple indicators of physical output for each policy area. Education is measured by literacy, proportion of age cohorts in school, student-teacher ratios, and other indicators detailed as follows. Public health is similarly measured by life expectancy, infant mortality, access to safe drinking water, and other indicators. The data for our dependent variables were obtained from the World Bank.[23] The complete list and definitions are given in Table 1.

We obtained sufficient data on 17 different indicators suitable for our cross-sectional analysis. To economize on data collection in an environment with a large number of missing observations, we employed two criteria for selection. First, because our dependent and independent variables come from different sources (see below), we wanted to limit our analysis to a small number of years. Not all measures, however, are collected annually from the same countries, meaning that most years tend to have observations for a large number of countries on only one or several of the indicators. Second, because

*(text continues on p. 603)*

23. Data are from World Bank (1995) and updated where available from subsequent annual editions of the World Bank's *Social Indicators of Development* and *World Tables*.

Table 1
*Effects of Democracy on Provision of Public Services: Results From 38 Cross-Sectional Ordinary Least Squares Analyses*

| Dependent Variable and Year | Predicted Sign | Lag (years) | Coefficient (*SE*) | Significance Level | Effect of Moving From Least to Most Democratic | Number of Nations (*n*) |
|---|---|---|---|---|---|---|
| Education | | | | | | |
| Adult illiteracy (percentage of population age 15 and older) | | | | | | |
| 1990 | – | 0 | –1.25 (.337) | .001 | –26 | 72 |
| 1985 | – | 0 | –1.14 (.326) | .001 | –24 | 80 |
| Persistence to fourth grade (percentage of cohort attending fourth grade) | | | | | | |
| 1992 | + | 3 | .478 (.171) | .009 | 10 | 37 |
| 1985 | + | 4 | .499 (.232) | .036 | 10 | 68 |
| Primary pupil-teacher ratio (ratio of pupils per teacher in primary school) | | | | | | |
| 1990 | – | 0 | –.616 (.221) | .007 | –13 | 73 |
| 1985 | – | 0 | –.362 (.205) | .081 | –8 | 84 |
| 1975 | – | 0 | –.610 (.166) | .001 | –13 | 86 |
| Primary gross enrollment ratio (ratio of pupils enrolled in primary school relative to total cohort) | | | | | | |
| 1990 | + | 1 | .647 (.342) | .062 | 14 | 92 |
| 1985 | + | 1 | .705 (.304) | .023 | 15 | 93 |
| 1970 | + | 1 | .916 (.402) | .025 | 19 | 89 |
| Secondary gross enrollment ratio (ratio of pupils enrolled in secondary school relative to total cohort) | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1990 | + | 0 | 1.17 (.272) | .001 | 25 | 80 |
| 1987 | + | 6 | .597 (.302) | .051 | 13 | 95 |
| 1975 | + | 4 | .746 (.242) | .003 | 16 | 92 |
| Tertiary gross enrollment ratio (ratio of pupils enrolled in tertiary school relative to total cohort) | | | | | | |
| 1990 | + | 0 | .488 (.173) | .006 | 10 | 78 |
| 1987 | + | 0 | .406 (.157) | .012 | 9 | 92 |
| Public health | | | | | | |
| Health care access (percentage of population with access to health care) | | | | | | |
| 1985 | + | 2 | 1.26 (.327) | .001 | 26 | 55 |
| Clean water access: Total (percentage of total population with access to clean water) | | | | | | |
| 1985 | + | 7 | 1.12 (.323) | .001 | 23 | 76 |
| 1975 | + | 5 | 1.05 (.364) | .006 | 22 | 52 |
| Clean water access: Rural (percentage of rural population with access to clean water) | | | | | | |
| 1985 | + | 7 | 1.32 (.432) | .003 | 28 | 79 |
| 1975 | + | 5 | 1.30 (.432) | .004 | 27 | 48 |
| Clean water access: Urban (percentage of urban population with access to clean water) | | | | | | |
| 1985 | + | 7 | 1.10 (.301) | .001 | 23 | 82 |
| 1975 | + | 4 | 1.05 (.530) | .053 | 22 | 52 |
| Population per physician (number of people per physician) | | | | | | |
| 1985 | – | 7 | –340.6 (203.8) | .103 | –7,152 | 43 |
| 1975 | – | 0 | –645.6 (307.9) | .041 | –13,558 | 60 |
| Attended births (percentage of births attended by health personnel) | | | | | | |
| 1985 | + | 7 | 1.36 (.385) | .001 | 29 | 67 |



*(continued)*

Table 1 Continued

| Dependent Variable and Year | Predicted Sign | Lag (years) | Coefficient (*SE*) | Significance Level | Effect of Moving From Least to Most Democratic | Number of Nations (*n*) |
|---|---|---|---|---|---|---|
| DPT immunization (percentage of population younger than age 1 immunized against DPT) | | | | | | |
| 1992 | + | 1 | –.260 (.374) | .489 | 5 | 81 |
| 1985 | + | 1 | 1.66 (.435) | .001 | 35 | 57 |
| Measles immunization (percentage of population younger than age 1 immunized against measles) | | | | | | |
| 1992 | + | 2 | –.206 (.413) | .620 | –4 | 82 |
| 1985 | + | 1 | .587 (.610) | .340 | 12 | 59 |
| Crude death rate (per 1,000 population) | | | | | | |
| 1992 | – | 3 | –.219 (.069) | .002 | –5 | 106 |
| 1987 | – | 0 | –.180 (.063) | .005 | –4 | 110 |
| 1970 | – | 1 | –.175 (.089) | .052 | –4 | 97 |
| Infant mortality rate (per 1,000 live births) | | | | | | |
| 1992 | – | 2 | –1.98 (.520) | .001 | –42 | 104 |
| 1987 | – | 1 | –1.57 (.497) | .002 | –33 | 109 |
| 1970 | – | 1 | –1.50 (.582) | .012 | –32 | 97 |
| Life expectancy at birth (total population in years) | | | | | | |
| 1992 | + | 2 | .523 (.126) | .001 | 11 | 104 |
| 1987 | + | 0 | .364 (.111) | .001 | 8 | 110 |
| 1970 | + | 1 | .276 (.122) | .026 | 6 | 97 |

*Note:* DPT = diphtheria, pertussis, and tetanus.

other factors not included in our model—including the instability associated with a period of global transition, such as that from the mid-1980s to the early 1990s—may cause results to differ significantly by year, we wanted to obtain multiple observations for as many different indicators as possible. We therefore selected the two best years from each decade in our study (1970, 1975, 1985, 1987, 1990, and 1992), with "best" defined as those years in which a substantial cross-section of countries have available observations for the largest number of pertinent variables. Throughout our analysis, we report results for each dependent variable for each year in which observations for that variable are available.

The number of countries included in each regression range from a low of 37 to a high of 110, but for most models, the number of countries in any given year ranges between 55 and 85. Not all of the smaller sets of observations are limited to developed countries; for instance, persistence to fourth grade (in 1992), our smallest dataset, contains only four members of the Organization for Economic Cooperation and Development (OECD) and only seven countries in the top third of the income distribution for all countries in that year. In most cases, the dataset contains a mix of developed and developing countries.[24] The consistently strong results reported as follows indicate that our results persist across large variations in the sets of countries being assessed. Indeed, a strong positive relationship between democracy and public service provision appears in our results regardless of whether the observations consist mostly of developed countries, developing countries, or a mix of both.

For the TSCS analysis, we identified only five suitable indicators. Continuous data over an extended period for a consistent set of counties are difficult to obtain. At the same time, because change in our dependent variables is likely to be gradual, we also thought it appropriate to use 3- or 5-year increments, depending on data availability. Infant mortality rates are available for 92 countries in 5-year increments from 1967 to 1992. The percentage of the population younger than age 1 that is immunized against measles (measles immunization) is available for 64 countries, and the percentage of the population younger than age 1 that is immunized against DPT is available for 75 countries, both in 3-year increments from 1986 to 1995.[25] As immunization campaigns funded by external agencies may suppress the relationship between democracy and public health, our priors on these two variables (and

24. The variation in numbers of observations in different models limits our ability to compare the magnitude of effects across public service indicators and years—but this is not our primary purpose.

25. Data for democracy were unavailable in 1995. As a result, in some instances, 1995 data on measles and diphtheria, pertussis, and tetanus immunizations are tested against 1994 democracy data.

confirmed in the cross-sectional tests) are that they are likely to be less closely related to regime type than other indicators. None of our other dependent variables are as likely to be affected in this way. The percentage of the population with access to safe water (safe water access) is available for 22 non-OECD countries in 3-year increments from 1985 through 1994.[26]

Finally secondary gross enrollment ratios are available on an annualized basis for 62 countries from 1975 through 1993. Unfortunately few countries have data for all 19 years. Balancing our desire for a broad cross-section against the integrity of the statistical analysis, we elected to include only countries for which observations are available for at least 16 of the 19 years. Of those with three or fewer missing observations, the missing data points are interpolated from surrounding points.[27]

**DEMOCRACY**

As discussed above, central to the contestability of the political market are, first, the competition among alternative leaders for office and, second, the costs of removing existing rulers from power. High competition and low costs of participation are commonly associated with the concept of democracy. At the same time, there are many different paths to competition and political removal. To focus on only a narrow indicator of democracy, such as periodic elections, would prejudice our analysis and possibly mask important variations in how citizens control their states.

Of the existing indicators of democracy, that developed for the Polity III dataset appears ideally suited to measure the contestability of the political market. The Polity III dataset includes eight factors ranging from the degree of competitiveness of political participation to the degree of constraints on the chief executive, which are used to derive two weighted summary indicators, AUTOC and DEMOC (Jaggers & Gurr, 1996). The former employs five factors to estimate a country's level of autocracy, whereas the latter employs six factors to determine a country's level of democracy. The component indicators and, more important, the summary measures were designed to reflect the idea that there are many paths to democracy (or autocracy) (Gurr, 1989;

26. Some data for the 1994 observation on water access are missing and were constructed by combining data from 1993 through 1995. To avoid sacrificing additional countries, in Ethiopia in 1994 and Haiti in 1988, we carried over one missing observation on democracy from the prior year.

27. In the several cases in which missing data are found either at the beginning or end of the time series, the last available observation is carried over to the missing year.

Gurr, Jaggers, & Moore, 1990).[28] Rather than measure separately the effects of autocracy and democracy, we adopt the growing convention of combining the two scales into a single index, DEMOC-AUTOC, which runs from –10 to 10, with 10 being most democratic (Reiter & Stam, 1998; Ward & Gleditsch, 1998).

To check the robustness of our findings, all results reported below were replicated using the sum of the Freedom House scales for political rights and civil liberties (Gastil, 1987). Although the Polity III and Freedom House democracy scales are highly related (they correlate at .91), they are not identical. Nonetheless there were no consequential differences in our results using this alternative indicator.

**CONTROL VARIABLES**

We include five control variables in our basic cross-sectional model and seven in our TSCS model. Although there are certainly additional factors that might influence the provision of public services, we believe that these variables, discussed as follows, collectively address a majority of the potential alternative explanations. Excepting the several dummy variables we constructed, data for the control variables were available from the previously mentioned World Bank (1995) CD-ROM.

Per capita GNP, which employs the World Bank's Atlas method to adjust for exchange rate fluctuations and is measured in constant 1996 U.S. dollars, is included for obvious reasons. Wealthier citizens typically demand a higher level of public services and wealthier countries, in turn, can more readily afford to provide them. Similarly we include a dummy variable for countries belonging to the OECD to capture the possible qualitative difference between the mostly European, wealthy, and politically stable members of that organization and the rest of the world.[29]

Land area is controlled because, in many instances, a larger territory may make it more (or less) difficult to provide public services to all citizens. Similarly population is included both because it may be more (or less) difficult to provide public services to larger populations and to normalize our measures. Because many of the public services we consider are clearly less costly to provide in concentrated urban environments than in more sparsely populated

28. Gleditsch and Ward (1997) discuss the elements comprising the DEMOC and AUTOC scales and compare several additional indicators of democracy.

29. Countries were considered Organization for Economic Cooperation and Development (OECD) members if they were members in all or all but one time period included in our investigation.

rural communities, we also control for the percentage of the population living in urban areas (percentage urban population).

Year is included to de-trend the TSCS model and capture any secular trends not addressed by the other controls.[30] Last, our regime transition hypothesis predicts that states that have undergone substantial regime transitions—for example, moving from dictatorship to democracy—will have disproportionately larger variations in public service provision relative to states that have undergone no or only modest refinements of their existing political regimes—for example, moving zero, one, or two points on the 21-point Polity III Scale. In other words, we should observe larger per-unit effects of democracy on public service provision in countries that have undergone a significant political change.[31] To operationalize this prediction, we include a regime change variable, $|\Delta\text{democracy}|$, the absolute value of the change in democracy between year $t$ and year $t - 1$, and then interact democracy and regime change. This interaction term—democracy $\times|\Delta\text{democracy}|$—allows us to estimate the possibly nonlinear effects of democracy on public services as regime stability varies.[32]

**CROSS-SECTIONAL ANALYSIS**

We employ the following model for our cross-sectional ordinary least squares (OLS) analysis.

$$\begin{aligned} \textit{level of public service} = {} & + \beta_1\,(\text{democracy}) + \beta_2\,(\text{per capita GNP}) \\ & + \beta_3\,(\text{land area}) + \beta_4\,(\text{population}) \\ & + \beta_5\,(\text{percentage urban population}) + \beta_6\,(\text{OECD}) \end{aligned}$$

The results of our investigations are summarized in Table 1, which focuses on the effects of democracy for each year in which a given indicator was

30. As we shall see, the trend term is statistically significant in three of the five TSCS models. Hence we report our results with the trend term included. Nonetheless excluding it does not materially affect the reported results.

31. An alternative method for capturing any nonlinear effects of democracy is to add the quadratic of the democracy variable to the equation in place of the regime change and interaction terms. If highly democratic (autocratic) countries enjoy disproportionately high (low) levels of public services, the quadratic term should be statistically significant and in the same direction as the coefficient on democracy. Yet this model does not include a change variable and therefore does not properly test our second hypothesis. Moreover, when we tested this alternative specification, the results were consistently weaker than those including the regime change and interaction terms.

32. We recognize that this formulation is imperfect, as ideally one would want to check for both the direction of change and level of democracy. There are, however, only three even more

tested. The most important column is that which shows the substantive impact of democracy on the level of public services, which we report as the real change in the public service as a result of moving from the lowest to the highest level of democracy. For instance, the 26% in column 6 for health care access in 1985 indicates that moving from the lowest to highest level of democracy is associated with an increase of 26 percentage points from, for example, 30% to 56% of the population having access to health care. Table 1 also notes the coefficients, standard errors, and significance levels for the coefficients on democracy across each year and dependent variable as well as the predicted sign for each coefficient, the number of years the democracy variable was lagged, and the number of countries included in each regression.

Although we tested each model with lags ranging from 0 to 7 years, we report only the results of the "optimal" lag—or the lag that produced the largest and most highly significant coefficient on the democracy variable as well as the largest $R^2$ values.[33] As illustrated by the six examples in Table 2, the coefficients and significance levels on democracy and the $R^2$ values tend to follow orderly, predictable patterns, rising in a linear fashion as the lag period increases, reaching some peak, and then declining in both magnitude and significance.[34] This suggests that the reported coefficients and significance levels are not merely artifacts of the data.[35]

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unsatisfactory alternatives. First we could interact democracy with the change in democracy rather than with the absolute value of the change. This interaction term, however, loses directionality: A maximum change toward democracy (–10 to 10) and a maximum change toward autocracy (10 to –10) score the same. (Rescaling the democracy variable as positive integers, for example from 1 to 21, and interacting this with the change in democracy produces a meaningless interaction term, with a maximum decline in democracy, from 21 to 1, scoring a –20, for instance, and a modest decline in democracy for a middling country, from 10 to 5, scoring a –25.) Second we could interact the change in democracy with its absolute value, but this merely collapses the range of values on the interaction term without qualitatively altering the results. Finally we could simply employ the change in democracy, leaving out the interaction, but this fails to account for any possible nonlinearity and therefore does not test our second hypothesis.

33. We also tested our models with various lagged values of our control variables. Across a wide range of our dependent variables, including models in which the lag on the controls exceeded that on democracy, we found that varying the lag on the controls had virtually no effect on the magnitude or significance of our key variables. We therefore elected not to report results for any lagged control variables.

34. Selecting the optimal lag is, admittedly, a form of "data mining" in that we are allowing the data to dictate the lag structure employed in our models. Moreover by testing all of the models with each lag structure and choosing that which performs best, we are potentially biasing the standard errors by, in effect, increasing the probability of obtaining a significant coefficient among the several models. If our democracy coefficients tended to be significant under only a single lag structure and varied widely in a nonsystematic fashion across the others, such bias might be substantial. As Table 2 suggests, however, this is not the case. Our democracy coeffi-

Table 2
*Identifying Optimal Lags: Coefficients and Significance Levels (in parentheses) on Democracy and* $R^2$ *for Select Public Goods, as Lag Structure Varies From 0 to 7 Years (reported optimal lag in boldface)*

| Lag (years) | Water Access (1975) | Secondary Enrollment Ratio (1990) | Life Expectancy (1992) | Persistence to Fourth Grade (1992) | Infant Mortality Rate (1992) | Crude Death Rate (1992) |
|---|---|---|---|---|---|---|
| 0 | .60 ($p < .11$)<br>$R^2 = .64$ | **1.17 ($p < .001$)**<br>**$R^2 = .71$** | .37 ($p < .01$)<br>$R^2 = .67$ | .18 ($p < .36$)<br>$R^2 = .29$ | –1.47 ($p < .01$)<br>$R^2 = .61$ | –.11 ($p < .15$)<br>$R^2 = .32$ |
| –1 | .76 ($p < .06$)<br>$R^2 = .65$ | .98 ($p < .01$)<br>$R^2 = .70$ | .34 ($p < .01$)<br>$R^2 = .69$ | .24 ($p < .39$)<br>$R^2 = .30$ | –1.32 ($p < .01$)<br>$R^2 = .62$ | –.09 ($p < .18$)<br>$R^2 = .33$ |
| –2 | .86 ($p < .02$)<br>$R^2 = .66$ | .68 ($p < .05$)<br>$R^2 = .68$ | **.52 ($p < .001$)**<br>**$R^2 = .71$** | .23 ($p < .42$)<br>$R^2 = .30$ | **–1.98 ($p < .001$)**<br>**$R^2 = .64$** | –.19 ($p < .02$)<br>$R^2 = .33$ |
| –3 | 1.03 ($p < .01$)<br>$R^2 = .66$ | .59 ($p < .10$)<br>$R^2 = .67$ | .47 ($p < .001$)<br>$R^2 = .69$ | **.48 ($p < .01$)**<br>**$R^2 = .37$** | –1.62 ($p < .01$)<br>$R^2 = .62$ | **–.22 ($p < .01$)**<br>**$R^2 = .38$** |
| –4 | 1.04 ($p < .01$)<br>$R^2 = .70$ | .55 ($p < .12$)<br>$R^2 = .67$ | .37 ($p < .01$)<br>$R^2 = .67$ | .41 ($p < .01$)<br>$R^2 = .35$ | –1.31 ($p < .01$)<br>$R^2 = .61$ | –.19 ($p < .01$)<br>$R^2 = .36$ |
| –5 | **1.05 ($p < .01$)**<br>**$R^2 = .72$** | .53 ($p < .15$)<br>$R^2 = .67$ | .36 ($p < .01$)<br>$R^2 = .66$ | .36 ($p < .04$)<br>$R^2 = .33$ | –1.27 ($p < .01$)<br>$R^2 = .60$ | –.19 ($p < .01$)<br>$R^2 = .36$ |
| –6 | .86 ($p < .03$)<br>$R^2 = .71$ | .60 ($p < .11$)<br>$R^2 = .67$ | .35 ($p < .01$)<br>$R^2 = .66$ | .29 ($p < .11$)<br>$R^2 = .31$ | –1.27 ($p < .01$)<br>$R^2 = .60$ | –.18 ($p < .01$)<br>$R^2 = .36$ |
| –7 | .89 ($p < .02$)<br>$R^2 = .69$ | .56 ($p < .12$)<br>$R^2 = .67$ | .34 ($p < .01$)<br>$R^2 = .65$ | .28 ($p < .12$)<br>$R^2 = .31$ | –1.21 ($p < .02$)<br>$R^2 = .59$ | –.17 ($p < .01$)<br>$R^2 = .33$ |

The lags here must be interpreted carefully given the difficulty of altering basic trends in public health and education. The coefficients on democracy represent the short-term or impact effect of a change in democracy at year $t - j$ on public service provision in year $t$. The lag therefore indicates the year in which democracy exerts its strongest effect on the public service in question. This is not, however, equivalent to the cumulative effect of a change in democracy after $j$ years, and it does not indicate that the effect of democracy is exhausted after $j$ years.

Due to space limitations, we do not report the complete regressions on which Table 1 is based.[36] The results reported in Table 1 strongly and consistently support our two hypotheses across the 17 different dependent variables and over three decades. Democracy is significant at the .05 level or better in the predicted direction in 84% of the 38 OLS regressions reported (and at the .10 level or better in 92%). Overall, the coefficients on democracy in all but one of the 38 models are in the predicted direction.[37] These results strongly confirm our first hypothesis.

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cients tend to be consistent across multiple lag structures and tend to vary in a fairly systematic manner as the lag structures change. This suggests that any bias introduced by our optimal lag procedure is likely to be modest. Although we anticipate that most lags will be relatively short, absent a theoretical basis for predicting exactly how long it should take for democracy's effects to take hold, we believe it is preferable to allow the data to determine the appropriate lag structure, even at the risk of introducing some modest bias into our results.

35. Note, for instance, that among all six dependent variables shown in Table 2, the coefficients on democracy are significant for at least three of the eight lags (0 to 7 years). Indeed across the six variables, the average number of statistically significant years is 5.7 out of 8. Moreover, the significant years are clustered. In no case does democracy appear significant in 1 year, become insignificant in a prior year, and then reemerge as significant even further back in time.

36. These results are available on our Web site (http://weber.ucsd.edu/~dlake/cps/fullregression.htm) or from the authors upon request.

37. Statistical tests failed to detect any significant multicollinearity-related bias arising from such controls as per capita GNP and OECD. The correlation between democracy and per capita GNP is a surprisingly modest .42. Democracy correlates somewhat more closely with the OECD dummy, at .60. We conducted numerous tests to determine whether our statistical results were significantly biased by these correlations. Auxiliary regressions, purging the collinearity between per capita GNP and democracy as well as between OECD and democracy, produced largely similar coefficients and significance levels as those reported in Table 1. In addition, in most instances we found that the effects of democracy strengthen when either per capita GNP or OECD is omitted from the models. It is not surprising that this pattern was most pronounced for OECD, which is more closely correlated with democracy. Even in cases where the democracy coefficient decreased in magnitude or significance after excluding per capita GNP or OECD, such changes were relatively modest. Hence we conclude that the reported results are not substantially biased by including these control variables in our models. To the extent that multicollinearity exists, it makes it less (not more) likely that we will find a significant effect of democracy on public service provision.

Moreover, consistent with our regime transition hypothesis, the optimal lags tend to be quite short. Where intuition suggests that fairly long lags—perhaps of 5 years or more—would be required to influence such "sticky" indicators as infant mortality, in two thirds of the cross-sectional models the single greatest impact of regime type on the public service in question occurs within 2 years or less. A lag of 5 or more years is optimal in only 8 of the 38 cross-sectional models. Taken together, we interpret these overall results as strong support for our hypotheses.[38]

**POOLED TSCS ANALYSIS**

The cross-sectional analysis does not allow us to investigate directly the effects of over-time variations in regime type on the provision of public services. For such an assessment, we conducted a pooled, TSCS analysis on the five public service indicators previously described. For the TSCS investigations, we alter our basic model to include the trend term and, to test our regime transition hypothesis, the previously described regime change indicator and interaction term.[39] The resulting TSCS model is as follows.

38. It is possible that the marginal effect of changes in democracy may vary systematically, depending on a country's location along the 21-point Polity III Democracy Scale. If so, our results may be masking some important differences between countries at different locations along the Democracy Scale. To test for this possibility, we created an additional scale, collapsing the 21-point scale into three categories: autocracy (countries scoring –10 to –6 on the 21-point scale), anocracy (countries scoring –5 to 5), and democracy (6 to 10). We retested our cross-sectional models using this new, collapsed scale. With very few exceptions, the results were comparable to those using the full scale. This suggests that our results are not substantially biased by employing the full scale. Hence to preserve as much information as possible in our key causal variable, we have elected to report only the results using the full 21-point scale.

39. Many of the countries in our dataset are located at or near the extreme ends, or the center, of the Democracy Scale at –10, 0, or 10. There are two possible explanations for this clustering. Either it represents a reasonable approximation of the real world in which case our specification is appropriate, or it is an artifact of the Polity III coding scheme in which case any interaction is an artifact of the data. In either case, we would observe disproportionate effects on public services among countries that have undergone substantial regime changes. If, however, the clustering is merely a coding artifact, it would be more appropriate to collapse the Democracy Scale and omit the interaction term and the regime change indicator (|Δdemocracy|). To determine the most appropriate model, we reran our time-series cross-sectional (TSCS) models using the collapsed Democracy Scale introduced in Note 38 (i.e., democracy, anocracy, and autocracy). If the clustering phenomenon is an artifact of coding rules, then we would expect the interaction to be insignificant once the Democracy Scale is collapsed, thereby eliminating any "small" changes. In contrast, if the effects of changes in democracy are truly nonlinear, then we would expect similar results from both the collapsed and uncollapsed Democracy scales and the corresponding interaction terms. In fact, our tests (not shown) indicated that collapsing the Democracy Scale produces minimal effects on our results. This suggests that the clustering is not an artifact of the

$$\begin{aligned} \textit{supply of public service} = \quad & + \beta_1 \text{ (democracy)} + \beta_2 \text{ (per capita GNP)} \\ & + \beta_3 \text{ (land area)} + \beta_4 \text{ (population)} \\ & + \beta_5 \text{ (percentage urban population)} + \beta_6 \text{ (OECD)} \\ & + \beta_7 \text{ (}|\Delta\text{democracy}|\text{)} + \beta_8 \text{ (democracy} \times |\Delta\text{democracy}|\text{)} \\ & + \beta_9 \text{ (year)} \end{aligned}$$

Table 3 presents the results of the five TSCS analyses. As in the cross-sectional model, we tested the democracy variable with lags ranging from 0 to 7 years. As we did previously, we report only the optimal lag for each regression.

One problem that must be addressed in any over-time statistical analysis is the potential presence of serial autocorrelation (Beck & Katz, 1995). Not surprisingly Lagrange multiplier and Durbin-Watson tests revealed the probable presence of serial autocorrelation in each of the five models. We therefore transformed each dependent variable into its first difference, or the change in the level of public services from time $t-1$ to time $t$, from time $t-2$ to time $t-1$, and so forth.[40] Specialized estimation procedures have been developed to address the many statistical problems that are endemic to TSCS panel data. Therefore, in addition to transforming the dependent variables, we employ a generalized estimating equations (GEE) model (Liang & Zeger, 1986)—a variant of the generalized linear model (GLM) that makes it possible to specify the within-group correlation structure of the panels as well as to correct for within-group heteroscedasticity.[41] A Lagrange multiplier test indi-

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Polity III coding scheme. Hence we report only the results from the full TSCS model, including the regime change indicator and the interaction term.

40. One consequence of transforming our dependent variables into first differences for the TSCS models concerns the differing interpretation of a variable in level versus first difference form. For instance, an increase in access to clean water of, say, 10 percentage points may have a very different impact on a country that moves from .10 to .20 than on one that moves from .80 to .90. Yet each would receive a score of .10 on the dependant variable. This may result in overestimating or underestimating the effects of our key causal democracy variable, in any given case (depending on where along the water access continuum the case lies). Despite this limitation and because we have no generalizable theoretical expectations concerning the form of any such nonlinearity, we believe the benefit of removing serial autocorrelation outweighs the costs. We have therefore elected to employ our dependent variables in first difference form throughout our TSCS analyses.

41. We employed the "xtgee" command in Stata, which uses the generalized estimating equations (GEE) variant of the generalized linear model (GLM). GEE is an appropriate estimator when the $t$ (number of time periods) in a panel dataset is smaller than the $n$ (number of groups or observations per time period), as is the case in each of our models. Although several GLM variants are potentially appropriate for our data, only GEE allows both specification of the within-group error correlation structure—an AR(1) autoregressive error structure in our models—and correction for within-group heteroscedasticity, using the "robust" command (which employs the

Table 3
*Pooled Time-Series Cross-Sectional Generalized Estimating Equations Analysis of Effects of Democracy on the Provision of Five Public Services*

| Independent Variable | Δ Secondary Enrollment Ratio (1975-1993; $N$ = 1,068) | | Δ Percentage of Safe Water Access (1985-1994 per 3 years; $n$ = 67) | | Δ Percentage of Measles Immunization (1986-1995 per 3 years; $n$ = 176) | | Δ Percentage of DPT Immunization (1986-1995 per 3 years; $n$ = 211) | | Δ Infant Mortality (1967-1992 per 5 years; $n$ = 382) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | –.093 | (.017)**** | .128 | (.424) | –1.037 | (.518)** | –.502 | (.357) | .176 | (.053)**** |
| OECD | –.573 | (.310)* | | — | –2.215 | (2.533) | –.848 | (2.515) | 4.194 | (1.400)*** |
| Per capita GNP ($100) | .013 | (.002)**** | –.146 | (.095) | –.018 | (.009)** | –.031 | (.011)*** | .0002 | (.005) |
| Land area (100,000 km) | –.117 | (.043)*** | .703 | (.342)** | –.467 | (.352) | –.076 | (.232) | –.062 | (.121) |
| Population (1,000,000) | .013 | (.005)*** | .078 | (.111) | .156 | (.035)**** | –.008 | (.030) | –.024 | (.014)* |
| Percentage urban population | –.004 | (.009) | –4.683 | (3.250) | –.050 | (.038) | –.031 | (.030) | 6.072 | (2.411)*** |
| Democracy (–2 years) | | — | .050 | (.075) | | — | | — | .105 | (.050)** |
| Democracy (–3 years) | –.014 | (.016) | | — | .135 | (.181) | | — | | — |
| Democracy (–6 years) | | — | | — | | — | .099 | (.119) | | — |
| \|Δdemocracy\| (–2 years) | | — | –.699 | (.344)** | | — | | — | .095 | (.070) |
| \|Δdemocracy\| (–3 years) | .023 | (.037) | | — | –4.020 | (1.076)**** | | — | | — |
| \|Δdemocracy\| (–6 years) | | — | | — | | — | –2.125 | 1.083)** | | — |
| Democracy × \|Δdemocracy\| (–2 years) | | — | .066 | (.018)**** | | — | | — | –.017 | (.010)* |
| Democracy × \|Δdemocracy\| (–3 years) | .012 | (.005)** | | — | .863 | (.194)**** | | — | | — |
| Democracy × \|Δdemocracy\| (–6 yrs) | | — | | — | | — | .324 | (.108)*** | | — |
| Constant | 186.01 | (34.22)**** | –248.70 | (843.91) | 2077.48 | (1032.26)** | 1010.22 | (710.74) | –362.47 | (104.60)**** |
| $\chi^2$ | 78.05 ($p > \chi^2 = 0$) | | 185.15 ($p > \chi^2 = 0$) | | 269.36 ($p > \chi^2 = 0$) | | 61.45 ($p > \chi^2 = 0$) | | 361.12 ($p > \chi^2 = 0$) | |

*Note:* All models employ heteroscedasticity-consistent "robust" standard errors. DPT = diphtheria, pertussis, and tetanus; OECD = Organization for Economic Cooperation and Development; GNP = gross national product.
*$p$ < .10. **$p$ < .05. ***$p$ < .01. ****$p$ < .001.

cated that transforming the dependent variable was sufficient to mitigate the serial autocorrelation problem for secondary enrollment ratios but not for the other four dependent variables. We therefore specified an AR(1) autoregressive error correlation structure for the other four models.[42] Subsequent tests indicated that this procedure successfully mitigated the autocorrelation problem in each of the models.

As predicted by our primary hypothesis, the TSCS results indicate that in all five models reported in Table 3, increases in democracy are, under varying conditions, significantly related to increases in the provision of public services. Our TSCS results also strongly support the regime transition hypotheses. As in the cross-sectional models, the optimal lags tend to be short. In four of the five TSCS models reported in Table 3, the optimal lag on democracy was 3 years or less. Furthermore in all five TSCS models, democracy indeed appears to exert disproportionately large positive effects on public service provision among countries that have undergone a significant regime change, although this distinction is statistically significant at the .05 level in only four of the five models. Whereas relatively small variations in democracy do in some instances produce significant differences in the level of public services, relatively large changes in regime type have a consistently larger per-unit effect. We discuss each TSCS model in turn.[43]

Beginning with secondary school gross enrollment ratios, increases in democracy, particularly among regimes that have experienced large changes in democracy, do appear to produce greater rates of enrollment. The insignificant coefficient on the base category of democracy indicates that among highly stable regimes—those that have not moved at all along the Polity III Scale—democracy has no significant effect on the change in secondary school

Huber, or sandwich, estimator of variance). GEE is also robust to unbalanced panel data, which allowed us to modestly increase the number of observations included in our regressions. Additional testing (not shown) indicated that our results are largely unaffected by removing the several "unbalanced" observations to obtain perfectly balanced panels.

42. As expected, retesting the Secondary Enrollment Ratios Model with an AR(1) autoregressive error correlation structure did not appreciably alter the reported results.

43. One potential problem in interpreting our TSCS results is the difficulty in determining the direction of causality. It is possible that increases in public services expand democracy rather than the other way around. We conducted Granger causality tests on each model. Unfortunately, as is typically the case in TSCS data with a small number of time periods, for those models that included only three time periods (once the dependent variables were transformed into first differences), the tests proved inconclusive. However, for the secondary enrollment ratio and infant mortality models where we had a larger number of time periods, the tests indicated that changes in democracy did Granger-caused changes in secondary enrollment ratios and infant mortality rates, but neither secondary enrollment ratios nor infant mortality rates Granger-caused changes in democracy. These results appear to support our theory.

enrollment. Although seemingly at odds with our previous cross-sectional results, this is actually quite consistent as in these TSCS analyses the dependent variables are first differences. Hence countries that have not changed in their levels of democracy should not experience any significant changes in public services. Indeed in four of our five TSCS models, the coefficients on the base category of democracy are statistically insignificant. As we anticipated, after controlling for such factors as wealth, population, and urbanization, when democracy does not vary over time, neither does the provision of public services.[44]

Consistent with our regime transition hypothesis, adding the coefficient on the interaction term to that on the base category for democracy indicates that among countries that have moved by more than 1.2 points on the 21-point Democracy Scale, more democratic countries enjoy a higher ratio of students enrolled in secondary school, relative to the total cohort, than their less democratic counterparts ($p < .05$). If for instance, country *x* is 10 units more democratic than country *y* (on the 21-point Democracy Scale) and both countries undergo identical increases in democracy, each one-unit change in regime increases country *x*'s secondary enrollment ratio relative to country *y* by about .12 students ($p < .05$). Among countries that have undergone a maximum regime change, as democracy increases from its lowest to highest values, the ratio of enrollment in secondary school relative to the total cohort increases by nearly five students ($p < .05$). Although seemingly modest, the change attributable to variations in democracy appears more substantial when one considers that the overall mean annual change in secondary enrollment ratios among the countries included in our study during the 1975-1993 period is less than one (.98).

For safe water access, the negative and significant ($p < .05$) coefficient on |Δdemocracy| indicates that, ceteris paribus, regime change of any form is associated with reduced access to safe drinking water (one might think of this as a simple political instability effect). In contrast, the insignificant coefficient on democracy indicates that among countries that have undergone no regime change at all, democracy has no significant effect on changes in access to safe water. The sum of the coefficient on the interaction term and that on the base category for democracy, however, indicates that among countries that have moved by at least 1 point on the 21-point Democracy Scale (i.e., at least minimal regime change), the populations of more democratic countries enjoy greater access to safe drinking water than their counterparts in less democratic countries ($p < .001$). Among countries that have undergone

44. The sole exception to this pattern is infant mortality. As follows, we discuss the unique reasons for this exception.

a maximum regime change, as democracy increases from its lowest to highest values, the proportion of the population with access to safe drinking water increases by more than 27 percentage points.

Turning next to immunization against measles, the negative and significant ($p < .001$) coefficient on |Δdemocracy| indicates that, ceteris paribus, political change is associated with substantially reduced rates of immunization against measles. Among countries that have undergone a maximum regime transition, the rate of measles immunization is more than 84 percentage points lower than among those with no regime change. In turn, the insignificant coefficient on democracy indicates that among countries that have undergone no regime change, democracy has no significant effect on changes in rates of measles immunization. The sum of the coefficient on the interaction term and that on the base category for democracy, however, indicates that among countries that have moved by at least 1 point on the 21-point Democracy Scale, the populations of more democratic countries have substantially higher rates of immunization against measles than their counterparts in less democratic countries ($p < .001$). Among countries that have undergone a maximum regime change, a corresponding maximum increase in democracy is associated with a nearly 350 percentage poitns increase in measles immunization rates.

The results for DPT immunizations are similar to those for immunizations against measles. The negative and significant ($p < .05$) coefficient on |Δdemocracy| indicates that, ceteris paribus, political change is also associated with substantially reduced rates of immunization against DPT. Among countries that have undergone a maximum regime transition, the rate of DPT immunization is about 45 percentage points lower than among those with no regime change. In turn, the insignificant coefficient on democracy indicates that among countries that have undergone no regime change, democracy has no significant effect on changes in DPT immunizations. The sum of the coefficient on the interaction term and that on the base category for democracy, however, indicates that among countries that have moved by at least one point on the 21-point Democracy Scale, greater democracy is associated with higher DPT immunization rates ($p < .01$). Among countries that have undergone a maximum regime change, movement from the lowest to highest democracy score is associated with a nearly 132 percentage points increase in the proportion of the population immunized against DPT. It is interesting that in these data, immunization against DPT is the only public service indicator that requires a fairly long lag structure (6 years).

Turning finally to infant mortality, the coefficient on the interaction term indicates that regime change combined with greater democracy is associated with reduced infant mortality. For nations that have moved more than 6 points

on the Polity III Democracy Scale, greater democracy is associated with lower infant mortality rates ($p < .10$). Among countries having undergone a maximum regime change, as democracy moves from its lowest to highest values, the rate of infant mortality declines by nearly five deaths per 1,000 live births.

Seemingly paradoxically, however, the positive and significant coefficient on democracy ($p < .05$) indicates that among relatively stable regimes that have moved less than 6 points on the 21-point Polity III Scale, more democratic countries actually have slightly higher infant mortality rates than their less democratic counterparts. This finding, although inconsistent with our prediction, appears to be largely an artifact of oil wealth in the Middle East. These countries have experienced a substantially smaller degree of regime change on average than the other nations in the dataset during the 25-year time span covered in our analysis. The mean standard deviation in democracy among Middle East countries is almost 56% lower than for the rest of the countries in the dataset. At the same time, most of the oil-rich nations in the region have been able to dramatically reduce their infant mortality rates while preserving highly autocratic regimes. In fact, the only democracy in the region, Israel, was by far the least successful state in the region in reducing its infant mortality rate between 1967 and 1992 (although this is clearly due to Israel's substantially lower infant mortality rate at the outset of the period covered in our data). With the exception of Israel, the Middle East is characterized by a group of highly autocratic nations varying hardly at all on the Democracy Scale, yet dramatically improving their public health standards, at least as reflected in infant mortality rates. Respecifying the model with the addition of a Middle East dummy variable renders the coefficient on democracy insignificant, thereby resolving the apparent paradox.[45]

## DISCUSSION

We have presented the results from 43 regressions—38 cross-sectional and five pooled TSCS—covering 17 dependent variables representing both education and public health. Overall, the results are remarkably consistent across the entire range of dependent variables. Both cross-sectionally and over time, increases in the level of democracy are positively related to levels

45. Because this same logic applies equally to our other public service indicators, we respecified each TSCS model with the addition of a Middle East dummy variable. Although the results were not as dramatic, in each instance the coefficients on democracy and/or the interaction terms increased in magnitude and significance. However, because the Middle East dummy only alters the substantive effects in one of our five models, we elected to exclude it from the reported results.

of public services. Moreover, as predicted by our regime transition hypotheses, it appears that the effects of regime changes on the level of public service provision were both rapid and disproportionate.

In addition, the large $R^2$ values suggest that our two rather basic models explain an impressive portion of the variation on the dependent variables: the mean $R^2$ across the 38 cross-sectional models is .53. Also significant is the consistency in the effects of democracy on the different dependent variables across different decades. Our ex ante expectation was that we would observe fairly stable results in the cross-sectional analyses. However, this expectation was tempered by the possibility that increases in political instability during periods of major global transition and, in particular, the "third wave of democratization" that began in the mid-1980s might affect the provision of public services in ways not captured by our control variables. Our expectations are largely borne out on both counts. Although there is certainly some variation in the magnitude and significance of the coefficients in different time periods, our results tend to be quite similar in different decades across our cross-sectional analyses, suggesting that our results can be considered reasonably reliable. At the same time, fully half of the cross-sectional models for which democracy failed to achieve the .05 level of significance are from a single year (1985), and the remaining insignificant models were from 1990 and 1992. The modestly weaker relationships in the mid-1980s and early 1990s were not unexpected, given the global political upheavals underway during these periods.

## CONCLUSION

We have developed a theory of the state as a firm in a contestable political market and have shown how democracy constrains the exercise of its monopoly power. We hypothesized that democracies will enjoy a higher level of public services and tested this prediction both cross-sectionally and over time for a variety of public service indicators. The results strongly support our hypotheses. Across a wide range of the available evidence, democracies do produce a higher level of public services than other types of regimes. This is the first concrete evidence from the domestic political arena that democracies really do perform better. Not only are democracies more peaceful in their relations with one another, but they also provide a higher level of public services to their citizens. This appears to validate the current policy emphasis on promoting democracy around the world.

Analytically we also lay the foundation for a more general theory of politics. We do not dispute the importance of the "electoral connection" in

democracies—indeed, we build on this connection in our core argument for why democracies provide higher levels of public services. Rather, we call attention to the limited purview of the assumed electoral motivation for politicians and show how this is a reduced-form model drawn from a larger and more comprehensive theory based on utility maximization. Although reasonable for many purposes, this reduced-form model provides a poor starting point for a more general theory that includes both democracies and autocracies.

Politicians, like all individuals, seek to maximize their utility. As Hirshleifer (1987) notes, we should not assume that "Chicago aldermen [are] guided by goals any different from or higher than the goals of Chicago factory workers or Chicago economics professors" (p. 165). Likewise, we would add, we should not assume that democratic politicians are innately different from autocratic rulers. Everywhere politicians seek to maximize their own welfare. In turn, they seek to use the monopoly power of the state to earn greater returns for themselves and, through its internal hierarchy, for the corporate entity of the state.

Politicians differ not in their goals but in the institutional contexts in which they seek to satisfy their desires. Democratic politicians operate in environments where competition is sufficiently high and the costs of political participation sufficiently low that they are constrained from earning rents. In this context, it is not unreasonable to assume that they are only seeking election. Autocratic politicians operate in environments where the costs of competing for office and political participation are substantially greater, freeing them from tight constraints by the mass of citizens and revealing their true preferences more clearly. When politicians are not tightly bound by the citizens they oversee, they use the monopoly power of the state to earn rents for themselves. Beginning with a common motivation for politicians and varying the institutional constraints in which they operate provides a more firm foundation on which to build a general theory of politics.

The vision of politics at the core of our theory is admittedly bleak. Rapacious politicians exploit citizens to the full extent of their ability. This vision could be interpreted as supporting a radical antigovernment stance, similar to that taken by many contemporary political conservatives. In this view, the state and its citizens stand in opposition to one another in an enduring struggle. Government cannot be trusted. As a result, one could conclude, less government is always better than more.

We prefer to emphasize a more optimistic conclusion: Democracy works. It remains the most effective instrument available for controlling the state and producing public services. As understood by even the most strident advo-

cates of free markets, the state's authority and ability to exercise coercion make it uniquely suited to provide public services that would otherwise fall victim to market failures. Yet this same comparative advantage in coercion gives the state the ability to exploit those it nominally serves. Democracy is the instrument that allows the state to do good while tempering its capacity for exploitation. Democracy increases political competition and lowers the costs of removing officials from office. By making the political market more contestable, it constrains the monopoly power of the state and improves the material conditions of everyday life. This is no small feat.

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