Democracy's Unique Advantage in Promoting Economic Growth: Quantitative Evidence for a New Institutional Theory

Rui Tang and Shiping Tang*

"The democratic institutions alone can guarantee the freedom of critical thought, and the progress of science." —Karl Popper, *The Open Society and its Enemies*.

"Nowhere is freedom more important than where our ignorance is greatest——at the boundaries of knowledge." —Friedrich A. Hayek, *The Constitution of Liberty*.

I. INTRODUCTION

The relationship between types of political regime (hereafter, regime) and economic development (or economic growth in the long run, hereafter, growth) has been an enduring question.[1] There, however, has been no firm consensus on which type of regime---most prominently, democracy or autocracy, is more conducive to growth.

On the theoretical front, while many have forcefully argued that democracy is more conducive to growth than autocracy (e.g., Olson 1993; Bhagwati 2002; North et al. 2009; Acemoglu and Robinson 2012), equally many have also contended that autocracy may actually be good for growth (e.g., Huntington 1968; Bhagwati 1982; Olson 1982). On the empirical front, robust relationships between regime and growth have been elusive for a long while, although some recent works seem to identify a democratic advantage in prompting growth. Overall, the jury is still out whether democracy holds some important, if any,

[1]Throughout the article, by liberty we mean *political* liberty or freedom. We use "economic freedom" (rather than economic liberty) to describe aspects of economic governance (e.g., taxation, property rights etc.)

advantage in prompting growth versus autocracy (Murtin and Waciarg 2014; Pozuelo, Slipowitz, & Vuletin 2016; Truex 2017; cf. Acemoglu et al. 2014; Knutsen 2013; for a recent overview, see Knutsen 2012).

We suspect that a key reason behind our failure to uncover a robust relationship between regime and growth has been our failure to adequately theorize the channel (s) through which democracy impacts growth, especially the channel (s) in which democracy holds exclusive or unique advantages. In other words, we need to identify the channel (s) in which an autocracy cannot possibly match democracy, even if the autocracy wants growth dearly.

In an accompanying article (S. Tang 2018), bringing together the classic defense of liberty and democracy, the political economy of hierarchy, endogenous growth theory, and the new institutional economics on growth, we advance a new institutional theory regarding democracy's unique advantage in promoting growth, especially growth via innovation (for a brief summary of our theory, see section two below). Our new theory not only echoes the emerging consensus that political regime impacts growth through specific channels and is thus indirect but goes further on two fronts. *First, we identify the channel of liberty-to-(institutional and technological) innovation as the channel in which democracy holds a unique advantage over autocracy when it comes to promoting growth.*[2] *Second, we further hold that democracy's unique positive effect on the channel of liberty-to-innovation is conditioned by the level of economic development.* Moreover, unlike other possible channels identified in the literature, the channel of liberty-to-innovation does not require additional and often ad hoc assumptions about the personality, preferences, and skills of rulers to operate (for details, see S. Tang 2018). Our theory centered on the channel of liberty-to-innovation is thus more parsimonious than other theories on regime and growth that are explicitly or implicitly centered on other channels.

Our new theory has two straightforward empirical predictions. The first prediction is that only autocracies had killed key scientific innovations in history. In an accompanying paper (S. Tang 2018), we have presented qualitative evidence for the first prediction of our theory by examining three prominent historical cases (Roman Catholic Church's Inquisition against Galileo, the reign of Lysenko's pseudoscience over genetics in the former Soviet Union, and the suffocating of social sciences in communist countries).

The second prediction is that there should be a visible turning point in democracy's indirect effect upon growth via the channel of liberty-to-innovation, conditioned by the level of economic development (see section 2 below for details). In this article, we present quantitative evidence for this prediction. Based on data of 1970-2010 from 79 (and 112) developing countries, we obtain strong

---

[2]Hereafter, unless stated otherwise, innovation denotes both institutional and technological innovation.

empirical support for our theory.[3] To our best knowledge, we are the first to propose such an indirect and conditional effect of democracy upon economic growth and provide systematic quantitative evidence.

Five caveats are in order. First, we are only interested in uncovering democracy's unique advantage that cannot be matched by autocracies. We do not deny that democracy may hold additional advantages over autocracies in other channels when it comes to growth (e.g., property rights, investing in education). What we do suggest is that those other advantages can be mimicked by autocracies, in principle, if not often in reality. Second, we are not concerned with what happens after a (democratic or not) country becomes a developed country. We are thus agonistic about the possibility that specific institutions under democracy may actually hinder growth after a country becomes a fully developed country because developed democratic countries may possess some new growth-retarding dynamics such as pork-and-barrel politics and polarized partisan politics (e.g., Olson 1982). These issues can only be dealt with elsewhere. Third, by defending the economic value of democracy, we do not deny democracy itself is a normative value to be desired and defended for its own sake. In fact, we strongly concur with Ober (2008, 5-6) that when defending democracy, "ought" and "is" should be more tightly conjoined (see also Mackie 2003).

Fourth, because the literature on democracy and growth is too voluminous for a brief critique, we have delegated our critique of the existing literature on this topic to an online appendix (appendix A).[4] Here, suffice to note three key points. 1) There may be more than a single channel through which democracy impacts growth and these channels interact with each other. 2) The channels through which democracy holds advantages versus autocracy when it comes to promoting growth may have been historically contingent: democracies might have held different advantages over autocracies in different historical times and contexts (e.g., Lindert 2003; Wu 2012). This suggests a non-linear, if not a non-monotonic, relationship between democracy and growth. 3) To our best knowledge, none of the existing works has theorized about and uncovered a channel in which democracy holds a unique advantage over autocracy.

Finally, although at first glance our theory bears some similarities to Knutsen's (2015) thesis that democracy outgrows autocracy in the long run because democracy promotes faster growth of total factor productivity (TFP), our exercise differs from Knutsen's work on three key fronts. 1) Our theory is a far more

---

[3]Aghion, Alesina, and Trebbi (2008) found that the closer a country is to the technological frontier, the more critical democracy becomes for growth. Their results thus similarly imply that more advanced economies benefit more from democratic institutions. They, however, do not directly test this implication but rather infer it from results based on sector-specific data. Also, they hold that it is the freedom of entry that explains democracy's advantage in promoting growth in more advanced sectors.

[4]For all appendixes, see R. Tang and S. Tang, 2018. Supporting Information to Democracy's Unique Advantage in Promoting Economic Growth: Quantitative Evidence for a New Institutional Theory.

integrated effort than Knutsen's theorization. 2) Our theory singles out the channel of liberty-to-innovation as the channel in which democracy holds unique advantage over autocracy whereas Knutsen treats TFP growth as just another channel which democracy may hold advantage over autocracy (see also Acemoglu et al. 2014). 3) Our theory emphasizes that democracy's impact upon growth via the channel of liberty-to-innovation is conditioned by the level of economic development (i.e., only after GDP per capita reaches a certain level would democracy's advantage comes to kick in) whereas Knutsen (2015) argues that democracy's effect upon TFP growth is unconditional.[5]

The rest of the article is structured as follows. Section II introduces our theory that is developed in more detail in an accompanying paper and lays out its key empirical hypotheses. Section III presents our quantitative evidence. Section IV draws key theoretical and empirical implications. A brief concluding section follows.

II. DEMOCRACY'S UNIQUE ADVANTAGE IN PROMOTING GROWTH: A NEW INSTITUTIONAL THEORY

Our theory regarding the relationship between regime and growth builds upon a diverse literature, including the classic defense of liberty and democracy, endogenous growth models centered on knowledge, the political economy of hierarchy, and the notion that economic development can be divided into two different stages.[6]

We begin by underscoring that the coming of hierarchy in human society poses two opposing dynamics for growth. On the one hand, hierarchy facilitates growth, most critically because it provides sociopolitical order and stability. On the other hand, however, hierarchy also inherently hinders bottom-up "institutional and technological innovation" (hereafter, "I/T-innovation", or simply "innovation") and thus growth because it demands "obedience to authority" (hereafter, OTA) and OTA hinders bottom-up innovations. Since bottom-up I/T-innovation is indispensible to growth, this means that the state, as a hierarchy, must strike a delicate balance between maintaining order and stability and facilitating bottom-up innovation in order to achieve growth.

Drawing from the classic defense of liberty and democracy, we then contend liberty is the most effective way for achieving the delicate balance between maintaining order and stability by demanding OTA and encouraging innovation

---

[5]Our empirical results also show that that democracy's effect upon TFP growth is unconditionally insignificant when using TFP data from the more widely used Penn World Table dataset (see Appendix C). Knutsen (2013) reported that democracy prompts growth by interacting with low state capacity. Again, he does not theorize this interactive effect as a unique channel through which democracy impacts growth (see also Hanson 2015). Democracy may also contribute to state capacity, at least in the long run (e.g., Wang and Xu 2015).
[6]For the fuller exposition of our theory, see S. Tang (2018).

under hierarchy. Further, because economic development goes through the stage of growth via imitation (or catching-up) and then the stage of growth via I/T-innovation, liberty may not be crucial when growth mostly depends on imitation. When growth has to depend upon innovation more, however, liberty becomes more critical because only liberty protects and prompts bottom-up I/T-innovation. As such, by protecting liberty, democracy is more conducive to growth via bottom-up I/T-innovation because it counters hierarchy's structural impediment against bottom-up I/T-innovation while maintaining order and stability better than autocracy (see also S. Tang 2011).[7]

Hence, the liberty-to-innovation channel is the primary, if not the only, channel in which democracy holds a unique advantage over autocracy when it comes to promote growth because democracy better counters hierarchy's detrimental effect upon bottom-up I/T-innovation than autocracy. Fundamentally, democracy achieves a better balance between maintaining order and stability and encouraging bottom-up I/T-innovation by protecting liberty better than autocracy. In contrast, autocracy depresses growth via bottom-up I/T-innovation because it suppresses liberty and thus bottom-up I/T-innovation for the sake of order and stability by demanding excessive OTA from its subjects.

The liberty-to-innovation channel is thus a channel in which autocracy cannot possibly match democracy. Unlike efforts in other channels (e.g., protecting property rights, investing in human capital) that can generate growth without directly jeopardizing an autocrat's rule, the liberty-to-innovation channel vitally threatens his rule: an autocrat's survival fundamentally depends on limiting bottom-up institutional innovations and he thus can ill-afford to protect the liberty-to-innovation channel even if he wants growth dearly.

Although an autocrat can easily impose institutional changes, it inherently limits information flow within the whole social system, as all central planners do. As such, an autocrat cannot possibly design a sound institutional system all by himself (Lewis 1955, 80; Hayek 1960, 29-30). Democracy solves the problem of ignorance in decision-making by allowing (if not encouraging) bottom-up innovations, both institutional and technological. As such, when it comes to the possibility of installing a sounder institutional system for the whole society, democracy should out-duel autocracy, all else being equal.

Moreover, the virtue of liberty becomes more critical when an economy reaches the stage of having to grow via bottom-up I/T-innovation, because bottom-up I/T-innovation fundamentally requires liberty, as Hayek, Lewis, Polanyi, and Popper recognized long ago. Because democracy is a near necessary condition for system-wide bottom-up innovation, technological but

---

[7]For an in-depth discussion on how democracy counters hierarchy's detrimental impact upon innovation, again see our accompanying paper (S. Tang 2018).

especially institutional, democracy is a near necessary condition for growth via innovation.

A sounder institutional system in turn increases citizens' confidence in their abilities of changing the institutional system for the better via peaceful means and thus increases a society's stability. As such, individuals in democracies are more willing to invest in education, research, innovation, and enterprises than individuals in autocracies, all else being equal. These advantages in turn bestow democracies with a unique advantage over autocracy in promoting growth via bottom-up I/T-innovation.

Finally, precisely because democracy allows for system-wide bottom-up institutional change, a democracy maintains order and stability with less actual violence and threat of violence, thus incurs a smaller cost upon its economy. In contrast, because autocracy does not allow system-wide bottom-up institutional innovations, an autocracy must rely on the threat of violent force and actual use of violent force to maintain political stability. Inevitably, an autocracy's maintaining of order and stability entails a much larger cost for its economy.

Economic development inevitably generates new issues and challenges that have no readily available solutions and thus can only be tackled by bottom-up I/T-innovations. Bottom-up I/T-innovation thus gradually becomes more critical, especially when an economy reaches the stage of growth via innovation. Because liberty facilitates bottom-up I/T-innovation whereas OTA hinders it, democracy should hold a unique advantage over autocracy when it comes to growth, especially growth via bottom-up I/T-innovation.

The chain of logic behind our argument can be summarized straightforwardly as follows (Figure 1). 1) System-wide bottom-up I/T-innovation is necessary for growth via innovation. 2) Bottom-up I/T-innovation requires the freedom to challenge existing ideas and institutions. 3) Because democracy protects liberty better

Figure 1

Democracy's Unique Advantage in Promoting Growth. [Colour figure can be viewed at wileyonlinelibrary.com]
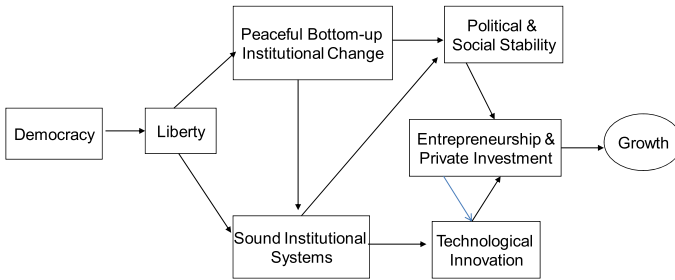
than autocracy, democracy promotes bottom-up I/T-innovation and thus growth via bottom-up I/T-innovation better than autocracy.

III. QUANTITATIVE EVIDENCE

In this section, we provide systematic quantitative evidence for the second empirical prediction of our theory, that is, there should be a visible turning point in democracy's indirect effect upon growth via the channel of liberty-to-innovation, conditioned by the level of economic development (measured in GDP per capita). Moreover, the channel of liberty-to-innovation is unique: democracy has no similar indirect and conditional effect upon other channels through which democracy may impact economic growth.

III.1. Sample and Data

As noted above, our theory predicts that below certain level of economic development when growth mostly depends on imitation or catching-up, democracy holds no statistically significant impact over the channel of liberty-to-innovation. After the economy reaches certain level of development and growth comes to depend on innovation more, however, democracy's positive effect upon the channel of liberty-to-innovation becomes more critical. We further argue that specific institutions under democracy may actually hinder growth after a country becomes a fully developed country because developed democratic countries may possess some new growth-retarding dynamics (e.g., pork-and-barrel politics, polarized partisan politics; Olson 1982). Accordingly we should test our theory with countries that have achieved developed country status relatively late and countries that have yet to achieve developed country status.[8]

For the sake of availability of sound macroeconomic data and other data, we choose countries that had yet to become developed economies in 1970. Following standard practices in cross country growth regressions (CCGRs), we also exclude "oil economies" (e.g., Kuwait, Saudi Arabia) and economies with a population of less than half million. Other countries excluded include newly independent countries (republics of former Soviet Union) and former East European socialist countries due to a lack of quality historical data before 1992. This leaves us with a sample of 79 countries or economies (Table AB-1 in Appendix B). The time span of our sample is 1970 to 2010. In the main document, we report main results from this dataset. Extensive robustness tests

---

[8]Doing so also reduces the weight of the highly unrealistic implicit assumption of sample homogeneity (i.e., all countries are similar or even the same through time and space) in our empirical inquiries. The practice of having all the countries in the same sample heavily depends on this unrealistic assumption (de Haan 2007).

Table 1

Descriptive Statistics of Variables

Variables	Explanation	N	Mean	Median	Std. Dev.	Max	Min
GDPpc	GDP per capita (constant 2005 price, taken log10)	3,091	3.218	3.195	0.572	4.724	2.136
Growth	Growth rate of GDP per capita (%)	3,117	1.794	2.112	5.156	37.128	-47.723
GDP deflator	GDP deflator (%)	3,117	49.945	8.417	628.649	26,765.9	-29.173
GCF	Gross capital formation (%)	3,065	22.062	21.636	8.111	73.495	-5.740
Pop growth	Population growth rate (%)	3,239	2.134	2.233	1.100	11.181	-6.343
Polity2	Polity2 score (Polity2)	3,235	0.647	0	7.113	10	-10
Lexical	Lexical index	3,237	3.432	3	2.413	6	0
Stability	Stability	3,153	25,086	26,062	2,058	26,187	0
Openness	Openness (%)	3,161	68.792	57.35	48.023	453.44	4.83
ELF6	Ethnolinguistic fractionalization (ELF6)	3,239	0.386	0.376	0.293	0.910	0.000
Schooling	Average school years	3,075	5.464	5.36	2.574	11.85	0.29
EA	East Asia	3,239	0.089	0	0.284	1	0
SSA	Sub-Sahara Africa	3,239	0.342	0	0.474	1	0
LAC	Latin American and the Caribbean	3,239	0.278	0	0.448	1	0
Landlocked	Landlocked or not	3,239	0.203	0	0.402	1	0
Tropical	Tropical (proportion)	3,239	0.635	1	0.456	1	0
Mortality	Child mortality (ln)	3,211	4.116	4.270	1.028	5.991	1.030
Life Exp	Life expectancy (ln)	3,239	4.107	4.149	0.184	4.402	3.287
CTFP	Current TFP level	2,288	0.620	0.600	0.299	2.388	0.0732
CTFP Growth	Growth rate of current TFP level	2,267	0.0130	-0.00418	0.426	18.853	-0.543
RTFP	Real TFP level	2,288	1.032	1	0.232	2.238	0.359
RTFP Growth	Growth rate of Real TFP level	2,267	0.000709	0.00264	0.0624	0.797	-0.564

are reported in Appendixes C, D, and E. Descriptive statistics of our main dataset is shown in Table 1 below (also as Table AC-2 in Appendix C).

As a set of robustness check, we also run the same set of regressions, including all the robustness tests, with data from 112 countries that include former East and Central European socialist countries even though these countries lack reliable data before 1992.[9] We obtain essentially identical results with this larger group of countries (see Appendix F for details).

III.2. *Strategies for Empirical Testing*

Our theory predicts two interacting pathways that connect democracy and growth via the channel of liberty-to-innovation (see Figure 1 above). More specifically:

[9]For a study that focuses on these "transitional economies" and also explores regime's indirect effect upon growth but not the interactive terms as we have done here, see Peev and Mueller (2012).

a) Liberty (protected by democracy) to institutional innovation, to political stability, to private investment (which may reflect both political stability and technological innovation), and finally to economic growth

b) Liberty (protected by democracy) to institutional innovation, to technological innovation, to private investment, and finally to economic growth.

In reality, however, it is difficult to disentangle these two pathways. Moreover, the linkage between institutional innovation and technological innovation cannot be easily established with quantitative data, due to the lack of data on either bottom-up institutional innovation or technological innovation, even in developed countries. Indeed, most developing countries did not have a sound patent system until fairly recently, and patents capture only a very small fraction of technological innovations. Also, to our best knowledge, there is no existing dataset that measures institutional innovations.

We therefore resort to a partial and indirect empirical strategy that tests these two pathways together. We seek to establish two key knots within the causal pathway from liberty to stability and from stability to economic growth. We first show that stability directly contributes to economic growth. Next, we show that democracy has an indirect effect on stability, conditioned by the level of economic development. We reason that more bottom-up institutional innovation reduces social conflict and hence enhances stability. As such, democracy should enhance stability, and this effect is conditioned by the level of economic development.[10] With liberty and bottom-up institutional innovation, political instability tends to be low and individuals tend to invest more in the economy. And when individuals invest more in the economy, it can be expected that more technological innovations will be produced. Both dynamics thus imply more growth. Hence, by identifying democracy's positive effect on political stability that is conditioned by the level of economic development, we indirectly identify the effect of the liberty-to-innovation channel on economic development, conditioned by the level of economic development.

As noted above, our theory does not exclude the possibility that democracy (via liberty) can and perhaps do impact growth via other channels, either positively or negatively. These channels may range from human capital, to openness of economy and gross capital formation (see Appendix A for details). What we contend is that the channel of liberty-to-innovation is the only channel in which democracy holds a distinctive advantage: non-democracy cannot imitate

---

[10]In other words, socio-political stability is a manifestation of particular social conditions plus institutional arrangements, and it critically depends on the liberty-(institutional) innovation channel: with liberty, people can demand and achieve institutional changes than without liberty. Without liberty, political unrest is almost inevitable or that superficial stability comes with a heavy price to growth: autocracies can only deploy more and more repressive forces to prevent outbreak of unrest. For empirical evidence, see Goldstone et al. (2010). For an interesting study that examines how stability in entrenched autocracy and new democracy impacts business at the firm level, see Nur-tegin (2014).

democracy on this front, fundamentally. As such, our theory predicts that democracy's conditional effect upon the channel of liberty-to-innovation via political stability to private investment and finally to growth should be unique. In other words, democracy's effect on political stability conditioned by the level of economic development should be robust whereas democracy should not have the same robust conditional effect upon other channels even if these channels may contribute to economic growth.

III.3. Models and Procedures[11]

We estimate the following interactive model for specific channels that may link democracy with economic development.

$$Y_{i,t} = \alpha_i + \beta_1 Demo_{i,t} + \beta_2 GDPpc_{i,t} + \beta_3 \left(Demo_{i,t}{}^* GDPpc_{i,t} \right) + \gamma Z_{i,t} + \varepsilon_{i,t}$$

Where $Y_{i,t}$ is the dependent variable of interest (e.g., growth rate of GDP per capita; political stability, gross capital formation etc.) of a country i at time t. $Demo_{i,t}$ is the democracy score of a country i at time t. $GDPpc_{i,t}$ is the level of GDP per capita (as the indicator of the level of economic development) of a country i at time t. To make interpretation of results with interactive terms easier, we take log10 for GDP per capita. $Z_{i,t}$ is the set of control variables for a country i at time t. Finally, $\varepsilon_{i,t}$ is the error term. All standard errors are clustered to countries.

For all the models, we are mostly interested in β_3, that is, the beta-coefficient in front of the interactive term of democracy score and level of economic development. We expect β_3 to be positive and significant only when the dependent variable is political stability but not with indicators for other channels. And these results should be quite robust with different indicators of democracy and model specifications.

For all the results reported in the main text, we perform extensive robustness tests. These robustness tests include: 1) lagging all independent variables one to three years; 2) using the very recent Lexical Index that is supposedly a more rigorous conceptualized for measuring electoral democracy rather than Polity2 score (Skanning et al. 2015); 3) all data are converted to three year average or five year average to minimize the possible impact of shocks; 4) employing data with 112 countries. These robustness tests are reported in Appendixes C, D, E, and F. Suffice to say that our results hold throughout all these extensive robustness tests.

---

[11]Due to space limitation, we address other technical issues in detail in Appendix B.

We admit that endogeneity may pose a problem to our results. Unfortunately, we do not see any viable instrumental variable because we are exploring interactive models. Although system GMM may be a useful technique, results from system GMM tend to be quite fragile (e.g., Bazzi and Clemens 2013; Murtin and Wacziarg 2014). Most critically, because our theory predicts a unique channel in which democracy holds a conditional positive effect, if we can show that this channel is indeed unique and robust to a variety of robustness checks, we shall have dispelled much doubt about our results.

III.4. Results

Democracy's uncertain direct effect upon growth Table 2 presents the results that test democracy's direct effect upon economic growth, with Polity2 score as the indicator for democracy. The dependent variable here is the growth rate of GDP per capita. Consistent with several recent studies, (e.g., Murtin and Wacziarg 2014; Truex 2017; cf. Acemoglu et al. 2014), we also find that the direct relationship from democracy to economic growth is uncertain. Model 1 is the baseline growth model. Consistent with the well-known thesis of "conditional convergence" in economic development, GDP per capita (in constant 2005 price) has a negative sign but just missed the cutoff level of significance. Meanwhile, gross capital formation has a positive sign and is highly significant. Model 2 regresses Polity2 score alone while model 3 controls for GDP per capita, and Polity2 score is insignificant in both models. Model 4 inserts Polity2 score in the full baseline growth model, and Polity2 score is now marginally significant. The effect of Polity2 score, however, is not robust after controlling for time trend (model 5). Polity2 score becomes more significant after inserting more control variables and with random effects models (model 6 and 7). Overall, whether Polity2 is significant critically depends on model specification, suggesting that whether democracy has an overall and direct effect upon economic growth is at least uncertain. We obtain essentially identical results whether we lag all explanatory variables one year, two years, or three years (Tables AC-2A, AC-2B, and AC-2C in Appendix C).[12] We obtain essentially the same results when using Lexical Index as the indicator for democracy (Appendix D).

The result of key interest from table 2, however, is that democracy has no conditional effect upon economic growth, regardless whether Polity2 score (or Lexical Index) is the indicator for democracy (Model 8). This result holds whether we lag all explanatory variables one year, two years, or three years (Tables AC-2A, AC-2B, and AC-2C in Appendix C and AD-2A, AD-2B, and AD-2C in Appendix D). These results suggest that there is something different

---

[12]We perform these tests because Acemoglu et al. (2014) suggest that lagging 3-5 years is necessary for revealing the effect.

Table 2

Baseline Growth Models with Polity2 Score (Dependent variable is the growth rate of GDP per capita)

	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) RE	(7) RE	(8) FE
Polity2		0.0192 (0.0258)	0.0129 (0.0259)	0.0217 (0.0260)	0.0272 (0.0328)	0.0355 (0.0222)	0.0419* (0.0244)	0.583*** (0.145)
GDPpc	-0.211 (1.223)		1.278 (1.439)	-0.344 (1.194)	-0.178 (1.292)	-0.431 (0.307)	-0.401 (0.299)	2.129 (1.337)
GCF	0.225*** (0.0252)			0.224*** (0.0253)	0.223*** (0.0249)	0.211*** (0.0224)	0.211*** (0.0222)	
Pop growth	-0.251 (0.247)			-0.240 (0.249)	-0.253 (0.261)	-0.253 (0.211)	-0.270 (0.219)	
Time Trend					-0.0465 (0.139)		-0.0722 (0.120)	
Polity2*GDPpc								-0.183*** (0.0476)
EA						1.431*** (0.547)	1.430*** (0.550)	
SSA						-0.290 (0.393)	-0.249 (0.411)	
LAC						-0.0739 (0.394)	-0.0911 (0.391)	
Landlocked						0.240 (0.375)	0.254 (0.378)	
Tropical						-0.457 (0.378)	-0.450 (0.377)	
ELF6						0.428 (0.585)	0.469 (0.589)	
Constant	-1.933 (4.052)	1.781*** (0.0210)	-2.308 (4.630)	-1.536 (3.953)	-1.911 (4.110)	-0.910 (1.196)	-0.808 (1.219)	-4.757 (4.299)
Observations	3,002	3,115	3,079	3,000	3,000	3,000	3,000	3,079
R-squared	0.072	0.000	0.001	0.072	0.072	0.545	0.550	0.010
No. of countries	78	79	78	78	78	78	78	78

Note: All models are OLS models. Robust standard errors are clustered to country.
Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$
All tables are reported in this format, unless indicated otherwise.

between democracy's direct effect upon growth and its indirect effect upon growth via specific channels (see the results reported immediately below).

Establishing that political stability contributes to economic growth Next, we establish a key knot in the causal pathway proposed by our theory, that is, political stability contributes to economic growth. As shown in Table 3, stability is positively associated with economic growth and its impact is highly significant and robust across models and samples (also see other tables in Appendixes C, D, E and F).

*Establishing the positive effect upon political stability of Democracy*GDPpc* In table 4, we provide evidence for our central empirical hypothesis, that is,

Table 3

Political Stability Contributes to Economic Growth (Dependent variable is GDP per capita growth rate)

	(1) FE	(2) FE	(3) FE	(4) FE	(5) RE	(6) RE
Stability	0.000302***	0.000291***	0.000234***	0.000233***	0.000208***	0.000208***
	(6.90e-05)	(6.81e-05)	(5.96e-05)	(6.01e-05)	(5.79e-05)	(5.84e-05)
GDPpc		0.751	-0.672	-0.778	-0.380	-0.368
		(1.510)	(1.284)	(1.313)	(0.342)	(0.323)
GCF			0.218***	0.219***	0.202***	0.202***
			(0.0262)	(0.0258)	(0.0230)	(0.0227)
Pop growth			-0.241	-0.233	-0.270	-0.275
			(0.238)	(0.255)	(0.206)	(0.222)
Time trend				0.0231		-0.0144
				(0.117)		(0.115)
EA					1.524***	1.522***
					(0.526)	(0.525)
SSA					-0.432	-0.425
					(0.383)	(0.392)
LAC					0.0969	0.0963
					(0.392)	(0.391)
Landlocked					0.337	0.342
					(0.386)	(0.391)
Tropical					-0.476	-0.472
					(0.370)	(0.366)
ELF6					0.557	0.566
					(0.616)	(0.615)
Constant	-5.722***	-7.840	-6.145	-5.871	-6.051***	-6.062***
	(1.732)	(5.094)	(4.484)	(4.549)	(1.992)	(1.978)
Observations	3,033	2,997	2,918	2,918	2,918	2,918
R-squared	0.012	0.012	0.078	0.078	0.516	0.517
No. of countries	79	78	78	78	78	78

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

democracy positively contributes to political stability, and this effect is conditioned by the level of economic development. This is indeed what we found: the interactive term of Polity2 score (or Lexical index) and GDP per capita is positive and highly significant, and this result is highly robust across different models. This result holds in our extensive robustness checks (see Appendixes C, D, E, F, and G for details).

Democracy's effect upon stability conditioned by the level of GDP per capita, can be graphically depicted in Figure 2 with Polity2 score (based on model 2 of table 3) or Figure AD-1 with Lexical Index (Appendix D, based on model 2 of Table AD-3). As shown in Figure 2, Polity2 score has no significant conditional effect upon stability below the level of GDP per capita of 489 (in constant 2005 US$) but begins to have a positive conditional effect upon stability above the level of GDP per capita of 489 (in constant 2005 US$). This positive conditional effect becomes stronger as the level of GDP per capita goes higher. The same pattern holds for Lexical Index, although the threshold for it is lower than Polity2 score.

Table 4

Conditional Effect of Polity2 Score on Political Stability at Different Levels of GDP per capita
(Dependent variable is Political Stability)

|	(1) FE	(2) FE	(3) FE	(4) FE	(5) RE	(6) RE
Polity2	23.72*	-155.4**	-191.4***	-198.9***	-173.4***	-197.7***
	(13.58)	(65.91)	(68.57)	(72.80)	(63.08)	(67.73)
GDPpc	1,698***	1,433***	1,245***	1,089*	735.3**	547.1*
	(531.0)	(491.2)	(465.5)	(563.3)	(305.5)	(303.9)
Polity2*GDPpc		57.59**	71.20***	72.18***	62.25***	65.74***
		(22.57)	(23.21)	(23.67)	(20.70)	(21.46)
GCF			27.53***	28.16***	30.52***	31.83***
			(7.277)	(7.398)	(7.152)	(6.984)
Pop growth			51.78	62.08	44.23	80.82*
			(64.40)	(54.55)	(58.01)	(45.97)
Time trend				39.19		123.0*
				(80.56)		(67.62)
EA					-544.7	-545.4
					(537.5)	(518.6)
SSA					890.5**	756.3*
					(452.3)	(438.1)
LAC					-342.9	-299.4
					(396.0)	(375.3)
Landlocked					221.8	147.1
					(247.0)	(240.6)
Tropical					331.7	280.9
					(364.1)	(332.4)
ELF6					-117.2	-221.5
					(413.4)	(412.5)
Constant	19,583***	20,344***	20,173***	20,540***	21,458***	21,756***
	(1,711)	(1,571)	(1,512)	(1,708)	(1,148)	(1,110)
Observations	3,007	3,007	2,926	2,926	2,926	2,926
R-squared	0.022	0.029	0.040	0.040	0.138	0.179
No. of countries	79	79	79	79	79	79

Robust standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

With results from Table 3 and Table 4, we can now calculate the growth rate of GDP per capita under different combinations of GDP per capita and Polity2 score. These results are presented in Table 5 (or Table AD-4 for Lexical index in Appendix D).

With Polity2 score as the indicator of democracy (table 5), at the level of GDP per capita of 500 US$ (constant 2005 price), the growth rate of GDP in a fully autocratic country (i.e., Polit2 score is -10) is identical to that in a fully democratic country (i.e., Polity2 score is 10). At the level of GDP per capita of 1000 US$, a fully democratic country will only grow about 5.5% faster than a fully autocratic country (annual growth rate for democracy is 1.93% vs. 1.83% for autocracy). At the level of GDP per capita of 2000 US$, however, a fully democratic country will now grow about 12.5% faster than a fully autocratic country (annual growth rate for democracy is 1.87% vs. 1.66% for autocracy).

Figure 2

Marginal effect of Polity2 score on stability at all levels of GDPpc_log10. [Colour figure can be viewed at wileyonlinelibrary.com]
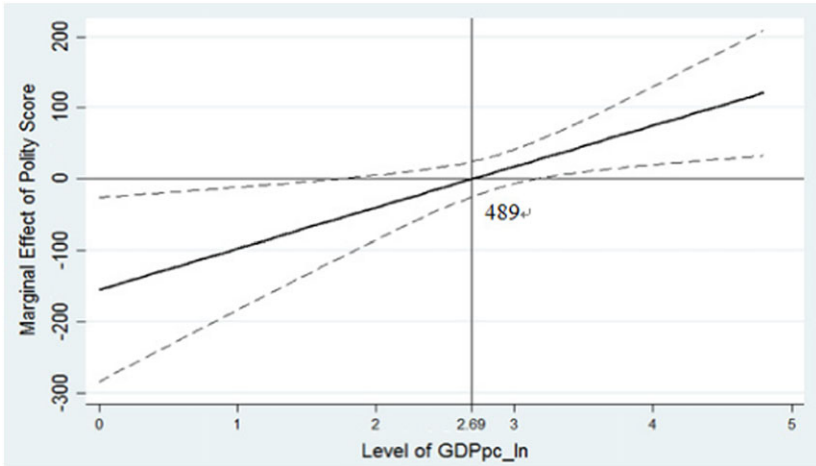
Note: Graph is based on Model 2 of Table above. The number 489 (US$, constant 2005 price) is the level of GDP per capita where Polity score begins to have a significant positive effect upon stability. Dashed lines represent the 95% confidence interval.

Table 5

Growth Rate of GDPpc with Different Combinations of Polity2 Score and GDPpc (GDP per capita in Constant 2005 US$)

	Polity=-10		Polity=-5		Polity=0		Polity=5		Polity=10	
GDPpc	Stability	Growth (100%)	Stability	Growth (100%)	Stability	Growth (100%)	Stability	Growth (100%)	Stability	Growth (100%)
100	23867.97	2.37	23622.97	2.32	23377.97	2.26	23132.97	2.20	22887.97	2.14
500	24241.07	1.99	24245.27	1.99	24249.47	1.99	24253.67	1.99	24257.87	1.99
1000	24400.97	1.83	24511.97	1.85	24622.97	1.88	24733.97	1.90	24844.97	1.93
2000	24560.87	1.66	24778.67	1.71	24996.47	1.76	25214.27	1.81	25432.07	1.87
4000	24720.77	1.50	25045.37	1.57	25369.97	1.65	25694.57	1.73	26019.17	1.8
8000	24880.67	1.33	25312.07	1.43	25743.47	1.54	26174.87	1.64	26606.27	1.74
10000	24933.97	1.28	25400.97	1.39	25867.97	1.5	26334.97	1.61	26801.97	1.72

Note: Growth rate of GDPpc1 calculated according to Model 3 of Table 3 and Model 3 of Table 4, with control variables taking mean value.

Moreover, this "democratic advantage" widens as the GDP per capita of an economy increases. At the level of GDP per capita of 4000 US$, a fully democratic country will grow about 20% faster than a fully autocratic country (annual growth rate for democracy is 1.8% vs. 1.5% for autocracy). At the level of GDP per capita of 8000 US$, the democratic advantage widens to 30% faster (1.74%

vs. 1.33%). At the level of GDP per capita of 10000 US\$, the democratic advantage further widens to 35% faster (1.72% vs. 1.28%).

Indeed, as the GDP per capita of an economy increases, even a half democratic country (i.e., Polity2 score is 5) will enjoy some significant democratic advantages over a half autocratic country (i.e., Polity2 score is -5). At the level of GDP per capita of 4000 US\$, even a half democratic country will grow about 10% faster than a half autocratic country (1.73% for the former vs. 1.57% for the latter). At the level of GDP per capita of 8000 US\$, this advantage widens to 14% (1.64% vs. 1.43%).

Here, it is interesting to note that consistent with the "conditional convergence" thesis in economic development (as captured in the baseline growth model), the growth rate of GDP per capita decreases as the GDP per capita of an economy increases. Yet, consistent with our core theoretical prediction, after crossing the threshold level of GDP capita (i.e., the turning point), democracy's (relative) advantage over autocracy becomes stronger as the GDP per capita of an economy increases and as a country becomes more democratic. A similar pattern emerges with Lexical index as the indicator of democracy (Table AD-4 in Appendix D).

Democracy*GDPpc has no similar effect upon other channels Next, we show that democracy has no such conditional effect upon other channels. We have tested all the channels with which we can have reliable data. The only channel that we do not test is "state capacity", because there is much conceptual and measurement uncertainty with indicators of state capacity and the relationship between indicators of state capacity with economic growth may be quite complex and non-monotonic (Hendrix 2010; Hanson and Sigman 2013; see also the special issue of *Democratization*, vol. 21, no. 7).[13]

The channels we have tested include: human capital (measured in average school years), economic openness, total factor productivity (TFP, measured in either current or constant dollar, data from Penn World Table 7.0), growth rate of TFP, and gross capital formation. Here, suffice to say that we found no conditional effect of democracy*GDPpc other than the channel of gross capital formation. Interestingly, democracy*GDPpc has a negative conditional effect on gross capital formation, and this effect is also highly robust. These results are reported in Appendix C, D, E, and F. All together, these results strongly suggest that the channel of liberty-to-innovation via political stability is indeed a unique channel in which democracy holds a distinct advantage over autocracy.

[13]Indeed, both Knutsen (2012) and Hanson (2015) have found that democracy seems to be a replacement to state capacity when it comes to contributing to economic growth---that is, the interactive term of democracy and state capacity has a negative effect on economic development, suggesting that the relationship between indicators of state capacity and economic growth may indeed be complex and non-monotonic.

Summary Overall, our extensive quantitative results strongly support our theory. Democracy has a strong, indirect, and positive effect upon political stability, conditioned by the level of economic development, and this effect is highly robust. Also consistent with our theory, democracy's indirect and positive effect upon political stability becomes stronger as the level of economic development gets higher. Because political stability contributes to economic growth directly, these results suggest that democracy too has a strong, indirect, and positive effect upon economic growth, conditioned by the level of economic development. Equally important, the channel of stability-to-growth is unique in the sense that democracy has no similar conditional effect upon other possible channels through which democracy may impact economic growth.

IV. IMPLICATIONS

We have advanced a new institutional theory that singles out the channel of liberty-to-innovation as the channel in which democracy holds a unique advantage over autocracy when it comes to prompting growth. In an accompanying paper, we have presented qualitative evidence showing that only autocracies had killed key scientific breakthroughs and consistently stymied the growth of social sciences. In this paper, we present systematic quantitative evidence for our theory. Together, these two papers complete our defense of democracy's indirect and conditional advantage for promoting economic growth, especially growth via innovation.

Our theory holds important theoretical and empirical implications for understanding the relationship between democracy and growth, and, more broadly, the relationship between institutions and growth in general. Theoretically, a key conclusion shared between our theory and a few others is that democracy's impact on growth is deeply contextual and historical rather than linear, monotonic, context-free, and trans-historical (e.g., Lindert 2003; Wu 2012). This insight points to some possible directions for reconciling many seemingly contradicting evidence and theories and throwing new lights on some empirical evidence that do not have a good theoretical explanation.

Empirically, our results provide a possible explanation for the many conflicting results from CCGR studies that show that democracy seems to hold positive, negative, or no discernable advantage over autocracy when it comes to prompting growth (see the "literature review" in Appendix A). Other than the more commonly acknowledged problems such as quality of data[14] (conceptualization, measurement, and selection bias), model specification, differences in

---

[14]More recently, Pozuelo, Slipowitz, and Vuletin (2016) challenged that the positive associative results between democratization/democracy and economic growth obtained by Papaioannou and Siourounis (2008) and Acemolgu et al (2014) have been mostly driven by endogeneity.

estimation techniques, and several unappreciated methodological problems in growth regressions with cross-sectional and panel data (for earlier discussions, see Temple 2000; de Haan 2007), we believe that there are two additional causes behind the inconclusiveness: the systemic nature of growth, the different demand on a society's institutions in different phases of economic development (for a more detailed discussion, see S. Tang, n.d.).

First and foremost, rather than impacting growth directly, political regimes influence growth indirectly through the institutional foundations they lay down and the economic policies they make and implement (Easterly 2005; Rodrik 2005; Persson and Tabellini 2006). Moreover, achieving and sustaining growth is a systemic effort: a state has to play with the combinations of channels, and both democracies and autocracies can get some channels right but some channels wrong. When this is the case, regime's positive effect and negative effect in different channels may cancel out each other. This possibility makes it difficult to reveal a clear-cut direct overall advantage for democracy in CCGRs. As such, a better strategy may be to pit democracy against autocracy in specific channels that may link regimes with growth and then assess the performance of democracy versus autocracy in these channels.

Second, different phases of economic development may require overlapping but still non-identical institutional systems. As such, regressions with all the countries in the world may not reveal any clear-cut relationship between regime and growth, and a more sensible strategy is to divide countries into samples according to their different stages of development and then compare regressions results across the different samples of countries.

Take the liberty-to-innovation channel for example. When a country is in the phase of growth via catching-up, its growth largely depends upon imitation, and it can grow "simply by modeling themselves on the more dynamic features of the more advanced" (Lewis 1955, 80). In contrast, when a country approaches the technological frontier (i.e. it has already caught up significantly), innovation becomes crucial for its growth. Hence, while autocracies may indeed catch-up (or imitate) well when they are governed by a "wise" autocrat (e.g., Chiang Ching-kuo, Deng Xiaoping, Park Chung-hee, and Pinochet), they simply cannot innovate well enough when their economies demand more innovation. Consequently, as an autocracy catches up, it may have to democratize in order to sustain further growth at the technological frontier, and autocracies that do not democratize will be less likely to sustain its growth momentum. Because the liberty-to-innovation channel is only one of the many channels that underpin growth, however, democracy cannot hope to achieve growth automatically by only getting the liberty-to-innovation channel right. Moreover, because all modern states, democratic or autocratic, are heavily bureaucratic societies and they all require OTA to function, the difference in OTA between democracies and autocracies is only a matter of degree, and OTA may still prevail more often than it

should even in democracies. Such a possibility inevitably makes revealing a clear-cut direct overall advantage for democracy in growth regressions more difficult (for a more detailed discussion, see S. Tang 2018).

Theoretically, if the notion that the impact of regime upon growth is both contextual and historical holds, it may allow us to synthesize many divergent theoretical insights.

To begin with, as Rose-Ackerman (2003) perceptively noted, Mancur Olson (1982; 1993) had expounded two evidently conflicting theories on the relationship between regimes and growth. Whereas Olson (1982) argued that vested interest groups are inimical to growth and periodical shattering of a society's power structure may be necessary for re-jumpstarting the economy (e.g., Japan and Germany after WWII), Olson (1993) contended that although a "stationary bandit" (i.e., autocracy) is definitely better than "roving (petty) bandits" (i.e., anarchy) in promoting growth in the beginning of organized economic life, only democracy can protect property rights credibly and thus sustain growth in the long run. The tension between "framework [i.e., institutional] stability" and "coalitional stability" within Olson's two stands is all too apparent. Unfortunately, although Rose-Ackerman (2003, esp. 164-68) correctly grasped this tension within Olson's oeuvre and pointed out that Olson's two stands started with two different background assumptions, neither she nor Olson (2000) could resolve the tension satisfactorily.

Our theory points to a possible dynamic solution to Olson's self-contradiction. The solution is that the institutional system for starting and sustaining growth in most developing countries, which contain more autocracies than democracies until the very recent, may be different, if not very different, from the institutional system for sustaining growth in developed countries that are mostly democracies. For most late developing countries, basic political order, essential state capacity most prominently embodied in political power that monopolized violence and infrastructural power such as a Weberian and effective bureaucracy, and secure property rights are the most critical requirements (Mann 1986; 1993; Evans and Rauch 1999; Kohli 2004; Slater 2010; Vu 2010).

In contrast, for developed countries that are also mature democracies, preventing the capture of the state by vested interest groups (hence limiting unproductive redistribution, which may include unsustainable welfare spending) and sustaining working ethics despite the increasing welfare state become more critical. Also, good governance is crucial for sustained growth regardless the regime type (Easterly 2005; Rodrik 2005).

Indeed, although both Olson and Rose-Ackerman (2003) have failed to grasp, Olson was grappling with the possible different institutional foundations for growth in different developmental stages. Whereas Olson (1982) dealt with growth in democratic developed countries, Olson (1993) dealt with economic development in the very beginning of organize economic activities in human

history and the (re-)establishment of order in late developers (for a more detailed discussion, see S. Tang, n.d.). When this is the case, we need a social evolutionary approach for understanding economic development across time and space (Tang 2017).

Second, Lindert (2003) links voice (which can only be adequate under full democracy, via franchising) to human capital and argues that democracy increasingly contributes to growth via human capital as history moves from the 17-19th centuries to the 20th century. Our theory and evidence suggest the impact of voice upon growth may not be due to the accumulation of human capital alone, but also due to the fuller realization of the potential of human capital under democracy. Because democracy protects liberty thus facilitates bottom I/T-innovation better than autocracy, human capital reaps greater return under democracy, especially at the stage of growth via innovation.

Third, the notion that the impact of regime upon growth is both contextual and historical suggests a new twist to the empirically well-supported Lipset thesis that countries with higher development (or income) level are more likely to have democratic governments (Lipset 1959; Barro 1997, chap. 2; Przeworski et al., 2000). Because democracy is critical to sustaining growth via bottom-up I/T-innovation, democratic regimes are more likely to deliver better economic performances in middle income countries or above. As a result, democracies are more likely to acquire performance-based legitimacy in these countries thus are more likely to survive in these countries. This suggests that a robust correlation between high income and democracy is observed precisely because democracy becomes more critical at a relatively high level of economic development.

Fourth, in light of the notion that the impact of regime upon growth is both context-dependent and historical, the almost exclusive focus on property rights (as "credible constraints on the extractive/predatory executive or Leviathan") in much of the "New Institutionalism Economics" (NIE) literature on growth has been unwarranted, if not misguided (e.g., North and Thomas 1973; North 1981; North and Weingast 1989; Olson 1993; Acemoglu et al. 2005; Acemoglu and Robinson 2012). Although the channel of property rights is certainly a key dimension in the overall institutional foundation of growth, it is not the only dimension (Bardhan 2005). After all, long before NIE became dominant, Milton Friedman (1962, 10) had pointed out that while all liberal democracies have secure property rights, it is not the case that every state with secure property rights is a liberal democracy.

Therefore, NIE of growth must (re-)connect with the literature on comparative economic development, most prominently represented by the literature on "developmental state" (e.g., Gerschenkron 1962; Johnson 1982; 1995; Deyo 1987; Amsden 1989; Haggard 1990; Wade 1990; Evans 1995; Kohli 2004; Slater 2010; Vu 2010; for a similar call, see Bardhan 2016). In short, we need "a more nuanced theory of the state." (Bardhan 1999; see also Lewis 1984) At the very

least, NIE must grasp that state can do far more than just protecting or not protecting property rights. The key question for any useful economic of growth is thus as much about the positive of making the state a helping hand as the negative of preventing states from being a grabbing hand.

Finally, our discussion also holds all-to-apparent implications for understanding the different challenges faced by two key developing countries: China and India. According to our theory and results, China will be increasingly hard-pressed to sustain its phenomenal growth without (smooth) democratization, now that it has reached the level of 8000$ in per capita GDP (current price, 2015 data, World Bank). Whether and when China will democratize relatively smoothly therefore has huge political and economic implications. Meanwhile, India faced a different set of problems. Due to a lack of strong state capacity from its colonial and democratic legacies, India had been slow in adopting necessary policy changes and building adequate infrastructures (including human capital). Hence, these two countries faced two very different sets of problems and it is not always enlightening to compare them on equal grounds.

V. CONCLUDING REMARKS

We have developed a more integrated and parsimonious theory regarding democracy's unique advantage in promoting economic development. Our discussion underscores that democracy holds an inherent advantage when it comes to growth via innovation. Fundamentally, by protecting liberty, democracy protects our rights to innovate bottom-up and change thus also our hope for continuous progress. In contrast, by taking away our liberty, autocracy takes away our rights of continuous innovation, thus our hope for continuous progress (Popper 1966[1945], vol. 2, 223; Polanyi 1956). Although autocracies may achieve robust growth for a period of time during growth via catching-up by investing heavily in physical infrastructure, heavy equipment, healthcare, education, and science and technology, autocracies cannot compete with democracies during growth via innovation because autocracies are inherently inimical to innovations, technological and institutional.

When defending the virtue of liberty and democracy, many have argued either that liberty is the best solution to the problem of knowledge (Polanyi 1941; Hayek 1945; Idem., 1960, chap. 2, 394; Lewis 1955, 80), or that liberal democracy is the best solution to social stability by allowing peaceful change of power (Mises 1996[1962], 42). In light of our theory, these two arguments then become two sides of the same coin: Liberty presents the best solution for achieving the delicate balance between maintaining order and social stability while promoting the accumulation of knowledge (thus growth) under hierarchy because liberty limits hierarchy and OTA's negative impact upon learning without jeopardizing order and stability. Hence, the central challenge of liberalism is not merely

reconciling freedom with authority, but rather achieving a balance between freedom and authority for the most desirable social outcome (Preston 1983; see also Bhagwati 2002; Rose-Ackerman 2003).

By revealing democracy's unique advantage in promoting growth, we have rediscovered the strength and virtues of classical and modern defenses of liberty and democracy, morally and economically. By so doing, we take away autocrats' ultimate justification for their survival, and state loud and clear that democracy is not only morally righteous, but also economically productive. In this sense, liberty is not "a sort of luxury good" (Barro 1996, 24), but a necessary good at a relatively advanced stage of economic development. In contrast, lack of liberty is a natural road to not only serfdom but also economic stagnation when growth via imitation inevitably runs out of its steam.

REFERENCES

Acemoglu, Daron, and James A. Robinson. 2012. *Why Nations Fail*. New York: Crown Publishers.

Acemoglu, Daron, Simon Johnson, and James A. Robinson.2005. "The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth." *American Economic Review*, 95(3): 546–579.

Acemoglu, Daron, Suresh Naidu, Pascual Restrpo, and James A. Robinson. 2014. "Democracy does Cause Growth," *NBER Working Paper, No* 20004.

Aghion, Philippe, Alberto Alesina, and Francesco Trebbi. 2008. "Democracy, Technology, and Growth," in Elhanan Helpman ed., *Institutions and Economic Performance*. Cambridge, M. A.: Harvard University Press, pp. 511-544.

Alesina, Alberto, Arnaud Devleeschauer, William Easterly, Sergio Kurlat, and Romain Wacziarg. 2003. "Fractionalization." *Journal of Economic Growth* 8: 155-194.

Amsden, Alice H. 1989. *Asia's Next Giant: South Korea and Late Industrialization*. Oxford: Oxford University Press.

Bardhan, Pranard. 1999. "Understanding Underdevelopment: Challenges for Institutional Economics from the point of view of poor countries," http://siteresources.worldbank.org/INTWDRS/Resources/477365-1257315064764/3194_bardhan.pdf, accessed June 20, 2013.

Bardhan, Pranard. 2005. "Institutions matter, but which ones?" *Economics of Transition* 13 (3): 499-532.

Bardhan, Pranab. 2016. "State and Development: The Need for a Reappraisal of the Current Literature." *Journal of Economic Literature* 54 (3): 862–892.

Barro, Robert J. 1996. "Democracy and Growth," *Journal of Economic Growth* 1 (1): 1-27.

Barro, Robert J. 1997. *Determinants of Economics Growth*. Cambridge, M. A.: MIT Press.

Bazzi, Samuel, and Michael A. Clemens. 2013. "Blunt Instruments: Avoiding Common Pitfalls in Identifying the Causes of Economic Growth," *American Economic Journal: Macroeconomics 2013*, 5(2): 152–186.

Bhagwati, Jagdish N. 1982."Directly Unproductive, Profit-Seeking (DUP) Activities," *Journal of Political Economy* 95 (5): 988-1002.

Bhagwati, Jagdish N. 2002. "Democracy and Development: Cruel Dilemma or Symbiotic Relationship?" *Review of Development Economics* 6(2): 151-162.

De Haan, Jakob. 2007. "Political Institutions and Economic Growth Reconsidered." *Public Choice* 127, 281–292.

Deyo, Frederic, ed. 1987. *The Political Economy of the New Asian Industrialism*. Ithaca: Cornell University Press.

Durham, J. Benson. 1999. "Economic Growth and Political Regimes." *Journal of Economic Growth* 4 (1): 81-111.

Easterly, William. 2005. "National Policies and Economic Growth: A Reappraisal." In, *Handbook of Economic Growth*, ed., Philippe Aghion and Steven N. Durlauf, vol. 1B. North-Holland: Elsevier, 1015-1059.

Epstein, Stephan R. 2000. *Freedom and Growth: The Rise of States and Markets in Europe, 1300-1750*. London: Routledge and LSE.

Evans, Peter, and James E. Rauch. 1999. "Bureaucracy and Growth: A Cross-National Analysis of the Effects of 'Weberian' State Structures on Economic Growth." *American Sociological Review* 64 (5): 748-765.

Evans, Peter. 1995. *Embedded Autonomy: State and Industrial Transformation*. Princeton: Princeton University Press.

Friedman, Milton. 1962. *Capitalism and Freedom*. Chicago: University of Chicago Press.

Gerschenkron, Alexander. 1962. *Economic Backwardness in Historical Perspective*. Cambridge, M A.: Harvard University Press.

Goldstone, Jack A. et al. 2010. "A Global Model for Forecasting Political Instability," *American Journal of Political Science* 54 (1): 190–208.

Haggard, Stephen. 1990. *Pathways from the Periphery: the Politics of Growth in the Newly Industrializing Countries*. Ithaca, N. Y.: Cornell University Press.

Hanson, Jonathan K. 2015. "Democracy and State Capacity: Complements or Substitutes?" *Studies in Comparative International Development* 55 (3): 304-330.

Hanson, Jonathan K., Rachel Sigman, 2013. "Leviathan's Latent Dimensions: Measuring State Capacity for Comparative Political Research," Working Paper, University of Michigan.

Hayek, Friedrich A. 1945. "The Use of Knowledge in Society," *American Economic Review* 35 (4): 519-530.

Hayek, Friedrich A. 1960. *The Constitution of Liberty*. Chicago: University of Chicago Press.

Hendrix, Cullen S. 2010. "Measuring State Capacity: Theoretical and empirical implications for studying civil conflict," *Journal of Peace Research* 47 (3): 273-285.

Huntington, Samuel P. 1968. *Political Order in Changing Societies*. Harvard University Press.

Johnson, Chalmers. 1982. *MITI and the Japanese Miracle: The Growth of Industrial Policy*. Stanford: Stanford University Press.

Johnson, Chalmers. 1995. *Japan: Who Governs? The Rise of the Developmental State*. New York: Norton.

Kohli, Atul. 2004. *State-Directed Development: Political Power and Industrialization in the Global Periphery*. Cambridge: Cambridge University Press.

Knutsen, Carl Henrik. 2012. "Democracy and Economic Growth: A survey of arguments and results," *International Area Studies Review* 15 (4): 393-415.

Knutsen, Carl Henrik. 2013. "Democracy, State Capacity, and Economic Growth," *World Development* 43 (1): 1018.

Knutsen, Carl Henrik. 2015. "Why Democracies Outgrow Autocracies in the Long Run: Civil Liberties, Information Flows and Technological Change," *Kyklos* 68(3):357–384.

Lewis, W. Arthur. 1955. *The Theory of Economic Growth*. Homewood, I. L.: Richard D. Irwin.

Lewis, W. Arthur. 1984. "The State of Development Theory," *American Economic Review* 74 (1): 1-10.

Lindert, Peter H. 2003. "Voice and Growth: Was Churchill Right?" *Journal of Economic History*, 63 (2): 315-350.

Lipset, Seymour M. 1959. "Some Social Requisites of Democracy: Economic Development and Political Legitimacy." *American Political Science Review* 53 (1): 69-105.

Mackie, Gerry. 2003. *Democracy Defended*. Cambridge: Cambridge University Press.

Mann, Michael. 1986; 1993. *The Sources of Social Power, 2 vols*. Cambridge: Cambridge University Press.

Mises, Ludwig von.1996[1962]. *Liberalism: The Classical Tradition*, 4[th]ed. New York: Foundation for Economic Education.

Murtin, Fabrice, and Romain Wacziarg. 2014. "The Democratic Transition," *Journal of Economic Growth* 19 (1): 141-181.

North, Douglass C. 1981. *Structure and Change in Economic History*. New York: Norton.

North, Douglass C., and Robert P. Thomas.1973. *The Rise of the Western World: A New Economic History*, Cambridge: Cambridge University Press.

North, Douglass C., and Barry Weingast. 1989. "Constitutions and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England." *Journal of Economic History* 49 (4): 803-832.

North, C. Douglass, John J. Wallis, and Barry R. Weingast. 2009. *Violence and Social Orders*. Cambridge: Cambridge University Press.

Nur-tegin, Kanybek. 2014. "Entrenched Autocracy or New Democracy: Which Is Better for Business?," *Kyklos* 67 (3): 398-419.

Ober, Josiah. 2008. *Democracy and Knowledge: Innovation and Learning in Classical Athens*. Princeton: Princeton University Press.

Olson, Mancur Jr. 1982. *The Rise and Decline of Nations*. New Haven: Yale University Press.

Olson, Mancur Jr. 1993. "Dictatorship, Democracy, and Development," *American Political Science Review* 87 (3): 567-576.

Olson, Mancur Jr. 2000. *Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships*, New York: Basic Books.

Papaioannou, Elias and Gregorios Siourounis. 2008. "Democratization and Growth." *The Economic Journal* 118 (5): 1520-1551.

Peev, Evegeni, and Dennis Mueller. 2012. "Democracy, Economic Freedom and Growth in Transition Economies," *Kyklos* 65 (3): 381-407.

Persson, Torsten, and Guido Tabellini. 2006. "Democracy and Development: The Devil in the Details," *American Economic Review* 96 (2): 319–324.

Polanyi, Michael. 1941. "The Growth of Thought in Society." *Economica*, N.S. 8(32): 428-456.

Polanyi, Michael. 1956. "The Republic of Science: Its Political and Economic Theory." *Minerva* 1 (1): 54-73.

Popper, Karl. 1966 [1945]. *The Open Society and its Enemies*, 2 vols. London: Routledge.

Pozuelo, Julia Ruiz, Amy Slipowitz, and Guillerrmo Vuletin. 2016. "Democracy Does not Cause Growth: the importance of endogeneity arguments," Inter-American Development Bank, working paper, June 2016.

Preston, Larry M. 1983. "Freedom and Authority: Beyond the Precepts of Liberalism," *American Political Science Review* 77 (3): 666-674.

Przeworski, Adam, Michael E. Alvarez, Jose Antonio Cheibub, and Fernando Limongi. 2000. *Democracy and Development: Political Institutions and Well-being in the World, 1950-1990*. Cambridge: Cambridge University Press.

Rodrik, Dani. 2005. "Growth Strategies." In, *Handbook of Economic Growth*, ed., Philippe Aghion and Steven N. Durlauf, vol. 1B. North-Holland: Elsevier, 967-1014.

Rose-Ackerman, Susan.2003. "Was Mancur a Maoist? An Essay on Kleptocracy and Political Stability," *Economics & Politics* 15 (2): 163–180.

Skanning, Svend-Erik, John Gerring, and Henrikas Bartusevicius. 2015. "A Lexical Index of Electoral Democracy," *Comparative Political Studies* 48 (2): 1491-1525.

Slater, Dan. 2010. *Ordering Power*. Cambridge: Cambridge University Press.

Tang, Shiping. 2011. *A General Theory of Institutional Change*. London: Routledge.

Tang, Shiping. 2017. "Toward Generalized Evolutionism: Beyond 'Generalized Darwinism' and its Critics," *Journal of Economic Issues* 51 (3): 588-612.

Tang, Shiping. 2018. "Hierarchy, Liberty, and Innovation: Democracy's Unique Advantage in Promoting Growth Restated," www.ssrn.com

Tang, Shiping. n.d. *The Institutional Foundation of Economic Development*. book manuscript in progress.

Temple, Jonathan. 2000. "Growth Regressions and What the Textbooks Don't Tell You," *Bulletin of Economic Research* 52 (3):181-205.

Truex, Rory. 2017. "The Myth of Democratic Advantage," *Studies in Comparative International Development* 52 (3): 261-277.

Tuong Vu. 2010. *Paths to Development in Asia*. Cambridge: Cambridge University Press.

Wade, Robert. 1990. *Governing the Market*. Princeton: Princeton University Press.

Wang Erik Haixiao, Xu Yiqing. 2015, "Awakening Leviathan: The Effect of Democracy on State Capacity, 1960-2009," Available at www.ssrn.com (accessed Jan.20, 2016)

World Bank. 1993. *The East Asian Miracle: Public Policy and Economic Growth*. New York, N. Y.: Oxford University Press.

Wu, Chin-en. 2012. "When Is Democracy Better for Economic Performance and When Is it Not: the interaction between polity and structural factors," *Studies in Comparative International Development* 47 (3): 365-388.

SUMMARY

Bringing together the classic defense of liberty and democracy, the political economy of hierarchy, endogenous growth theory, and the new institutional economics on growth, we propose a new institutional theory that identifies democracy's unique advantage in prompting economic growth. We contend that the channel of liberty-to-innovation is the most critical channel in which democracy holds a unique advantage over autocracy in promoting growth, especially during the stage of growth via innovation. Our theory thus predicts that democracy holds a positive but indirect effect upon growth via the channel of liberty-to-innovation, conditioned by the level of economic development. We then present quantitative evidence for our theory. To our best knowledge, we are the first to propose such an indirect and conditional effect of democracy upon economic development and provide systematic evidence. Our study promises to integrate and reconcile many seemingly unrelated and often contradictory theories and evidence regarding regime and growth, including providing a possible explanation for the inconclusive results from regressing overall regime score against the rate of economic growth or change in level of GDP per capita.